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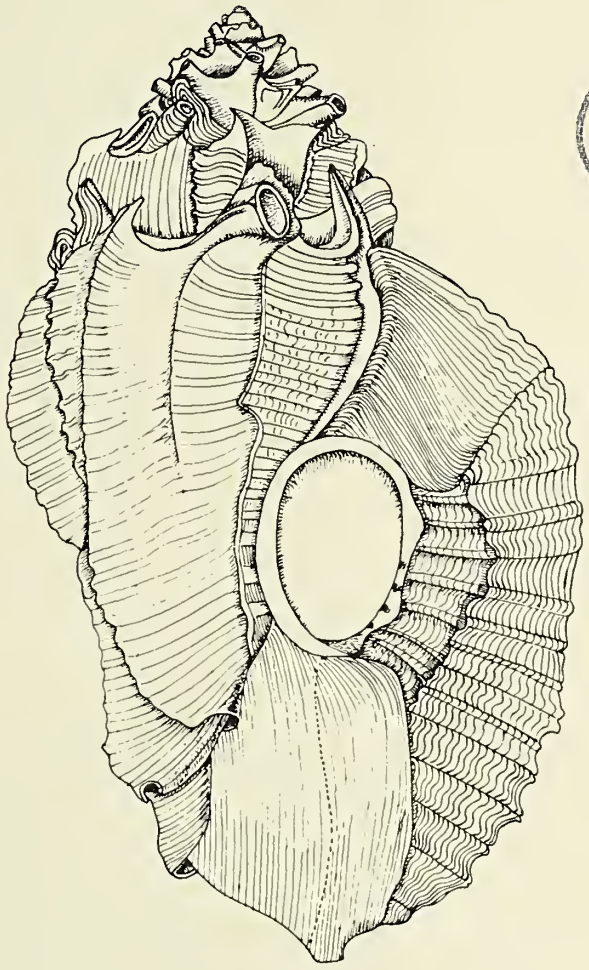

AN ILLUSTRATED CATALOGUE OF THE FAMILY TYPHIDAE COSSMANN, 1903

BY

ANTHONY D'ATTILIO AND CAROLE M. HERTZ

AN ILLUSTRATED CATALOGUE OF THE FAMILY TYPHIDAE COSSMANN, 1903 (GASTROPODA: MURICACEA)

BY

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ABSTRACT

The family Typhidae Cossmann, 1903, is here reinstated for this group of tube-bearing muricaceans. Divergent radulae and shell morphology indicate the existence of at least two subfamilial lines of parallel evolution in the Typhidae. The two lineages proposed here are Typhinae and Tripterotyphinae. We have listed the nominal genera within the subfamilial categories without rejecting any existing nominal genera. Illustrations of shell morphology and radular characters are provided for the genera. *Cinclidotyphis* and *Distichotyphis* are not included in either of the two subfamilies. Two catalogues enumerating nominal taxa, one of the described fossil and Recent genera and the other of fossil and Recent species in the Typhidae, are included. The chronology of the fossil genera and species remains in a state of flux, and the ages of the fossils indicated in this paper are based on existing literature. Any changes from previous works have been made on the advice of Dr. Emily H. Vokes.

INTRODUCTION

A catalogue of Typhinae was published by the late Dr. A. Myra Keen in 1944. This valuable work brought together most of the pertinent information useful for a monographic work on the systematics of this group of mollusks. At that time no comparative radular studies had been undertaken to reveal relationships in this group. In the intervening four decades, several extensive studies of the Typhinae have appeared. Two of these are faunal studies: Vella (1961) dealing with Australasia; and Gertman (1969) with the western Atlantic. In addition, many papers describing new species have been published, especially notable is Keen and Campbell (1964). Very few biological or ontogenetic studies of the typhids have been undertaken; most were based on shell morphology.

We have reinstated the family Typhidae for this unique group of gastropods in which the distinguishing character is the presence of a tube at the shoulder, which is presumed to function as a modification of an anal sulcus. This character is evident in all typhids, although the tube, as in *Prototyphis*, may not always be entirely sealed. Recent radular studies and studies of shell morphology clearly define the existence of at least two lines of evolution in the Typhidae. On the basis of shell and radula characters, it is proposed here that Tripterotyphinae represent a separate lineage of mollusks distinguished by having a trivaricate shell and muricopsine-like radula. Fleming (1962) first noted the relationship, based on shell characters, between the trivaricate muricaceans with tubes and established the subgenus *Nothotyphis*, placing it under *Pterynotus*. Typhinae includes the remaining twenty genera, except *Cinclidotyphis* and *Distichotyphis*, in which there are usually four or more varices per whorl.

This present work includes 180 validly proposed nominal species for the family Typhidae. Numerous illustrations of shell detail or entire shells are included to clarify morphological characters. Pertinent illustrations of radulae for each subfamily are also included; some of which were previously published in Radwin and D'Attilio (1976). The result of the additional radular studies reinforces the con-

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cept of the separate lineage of the trivaricate typhids first suggested by D'Attilio (1982) as well as emphasizing the anomalies in the Typhinae, which indicate that the placements of the genera in this subfamily are more than slightly provisional. The relatively large number of monotypic genera, for example, gives evidence that either we are dealing with mostly relict species living in restricted geographic areas or not enough oceanic investigations have been conducted to permit biogeographical studies.

ACKNOWLEDGMENTS

We are grateful to many people in the preparation of this paper. The following friends kindly made specimens available for study: Billee Brown, Joyce Gemmell, Charles Glass and Robert Foster, Tadashige Habe, Allan Horsfall, Roland Houart, David Mulliner, Donald Pisor, Roy and Forrest Poorman, the late Ruth Purdy, Carol Skoglund, Emily Vokes and Ethelyn Woodlock. William K. Emerson, Allan Horsfall, Roland Houart, Sadao Kosuge, and Emily Vokes also provided information valuable to our study and Jules Hertz and Barbara W. Myers made many helpful suggestions. William K. Emerson and Walter E. Sage, III critically read a draft of the paper and Jules Hertz proofread the final draft. Suzanne Parlett designed and prepared the cover.

In addition to the San Diego Natural History Museum, specimens were also examined from the collections of the American Museum of Natural History, the Santa Barbara Museum of Natural History, the United States National Museum and Tulane University.

Finally, we are indebted to Emily Vokes for her encouragement in this project and for critically reviewing several drafts of the manuscript.

HISTORICAL BACKGROUND

An historical survey of this family begins with Montfort (1810), who established the genus *Typhis* on a fossil species and designated *Purpura tubifer* Bruguiere, 1792, as the type. In his original description Montfort stated that the tube was a positive character of the genus and suggested that it was an organ either for excretion or breathing. Keen and Campbell (1964:57) stated that *Typhis* in Greek signifies smoke "but by extension was evidently intended to imply chimney (referring to the open tubes) by Montfort..."

The earliest illustrated catalogue of Recent *Typhis* was done by G.B. Sowerby, Jr., in 1841 on Plate 200 of the CONCHOLOGICAL ILLUSTRATIONS, in which he considered a total of five species. Sowerby *in* Reeve (1874) illustrated fifteen known species. First efforts at dividing the species generically were done by Jousseaume (1880), who placed them in twelve genera and Cossmann (1903), who established the subfamily Typhinae and recognized four genera and eight subgenera. Sacco (1904) proposed the family Typhidae in the index to volume 30 of I MOLLUSCHI DEI TERZIARII DEL PIEMONTE E DELLA LIGURIA; though in his text he placed the typhids in the Muricidae, subfamily Typhinae Cossmann, 1903. [Since Cossmann first established the familial group in naming the subfamily Typhinae, he becomes the authority for the family according to Article 36 of the INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE.] However, it was not until Keen (1944) that a major study of the typhid genera was undertaken. In this work Keen retained four genera with 13 subgenera, placing them in the subfamily Typhinae in the family Muricidae. Subsequent work on the systematics of the Typhidae was done by Vella (1961), who described eight new species, one new genus, and one new subgenus from New Zealand and by Fleming (1962). Keen and Campbell (1964) and Gertman (1969) each added ten additional new species. D'Attilio (1975, 1976, 1982, 1985, 1987) and Gemmell and D'Attilio (1979) published on the morphology of the typhids.

ECOLOGY AND LIFE HABITS

Very little published information is available concerning the anatomy, ecology and life habits of the Typhidae. In 1869:168-170, Caramagna published on his observations of the species *Typhis tetrapterus* Bronn, 1838 [=*T. sowerbii* Broderip, 1833] living in the Gulf of Spezia off the coast of Sicily. He noted that they were found living together on the base of a delicate alga, seemed to change locality with the

changing seasons, and were found in deeper water in the cold season. He suggested that animals of the genus *Typhis* came into the shallow, warm water for breeding.

Gemmell (1970:3-4) observed *Typhisala clarki* (Keen & Campbell, 1964) [identified as *T. coronatus*] in a restricted area of mud and cobbles at extreme minus tides (-1.2 m = -4 ft or lower) in San Felipe, Baja California Norte, Mexico. They were observed living in muddy silt with only the tubes protruding. Most specimens were observed in April when there were juveniles with the adults. Gemmell (1974:100-103) observed (and noted over a five year period) habits of *T. clarki*. She observed egg laying and larval development in the species as well as the egg capsule attachment in the aquarium. Egg laying, the capsules, and the veligers are described and illustrated in that paper

Marcel Mailly of Martinique (*in. litt.*) stated that *Talityphis perchardei* Radwin and D'Attilio, 1976, was found on sandy-mud with clay at 47-48 meters depth feeding on small bivalves. Included with his letter were specimens of juvenile *Pecten* and *Chione* upon which the *T. perchardei* were feeding.

A.W. Horsfall, in January 1985, noted (pers. comm.) that he had found *Typhina yatesi* [SDNHM 85968] "under sand on concave inner side of *Pecten bifrons* valve in [4.6 m] 15 feet of water on the rocky reef."

Clarkson (1984:8) observed *Tripterotyphis robustus* (Verco, 1895) in South Australia living on *Spondylus tenellus* (Reeve, 1856) in 8-10 meters of water. Specimens of *T. robustus* were usually found attached on or near the umbo or side of the lower valve. He observed *T. robustus* drilling and sealing each new hole in succession. He further observed that *T. robustus* is sexually dimorphic, the female about twice the size of the male. The sexes were found living together at all times and copulation was observed in the spring with the *Spondylus* serving as substrate for the egg capsules. The capsules are also described by Clarkson.

Typhid species commonly inhabit the low intertidal zone and the depths of the continental shelf, but some occur at even greater depths such as *Distichotyphis vemae* Keen & Campbell, 1964 in 1,856 meters. They are found in tropical and near-tropical waters (Keen, 1944; Vella, 1961). Their distribution is poorly known and no biogeographical study is possible at the present time. D'Attilio and Hertz (1984) published the known distribution of *Tripterotyphis lowei* Pilsbry, 1931 from the eastern Pacific to Queensland and northwest Australia. This is the only species, to our knowledge, whose wide geographical distribution has been noted.

As a result of the factors stated above, the paucity of live study material, the lack of biological information, the disparities gleaned from radula examination, and the few papers treating typhid biogeography, we believe it prudent to restrict this study, essentially, to updating the 1944 Keen catalogue and providing new insights into typhid structure and morphology.

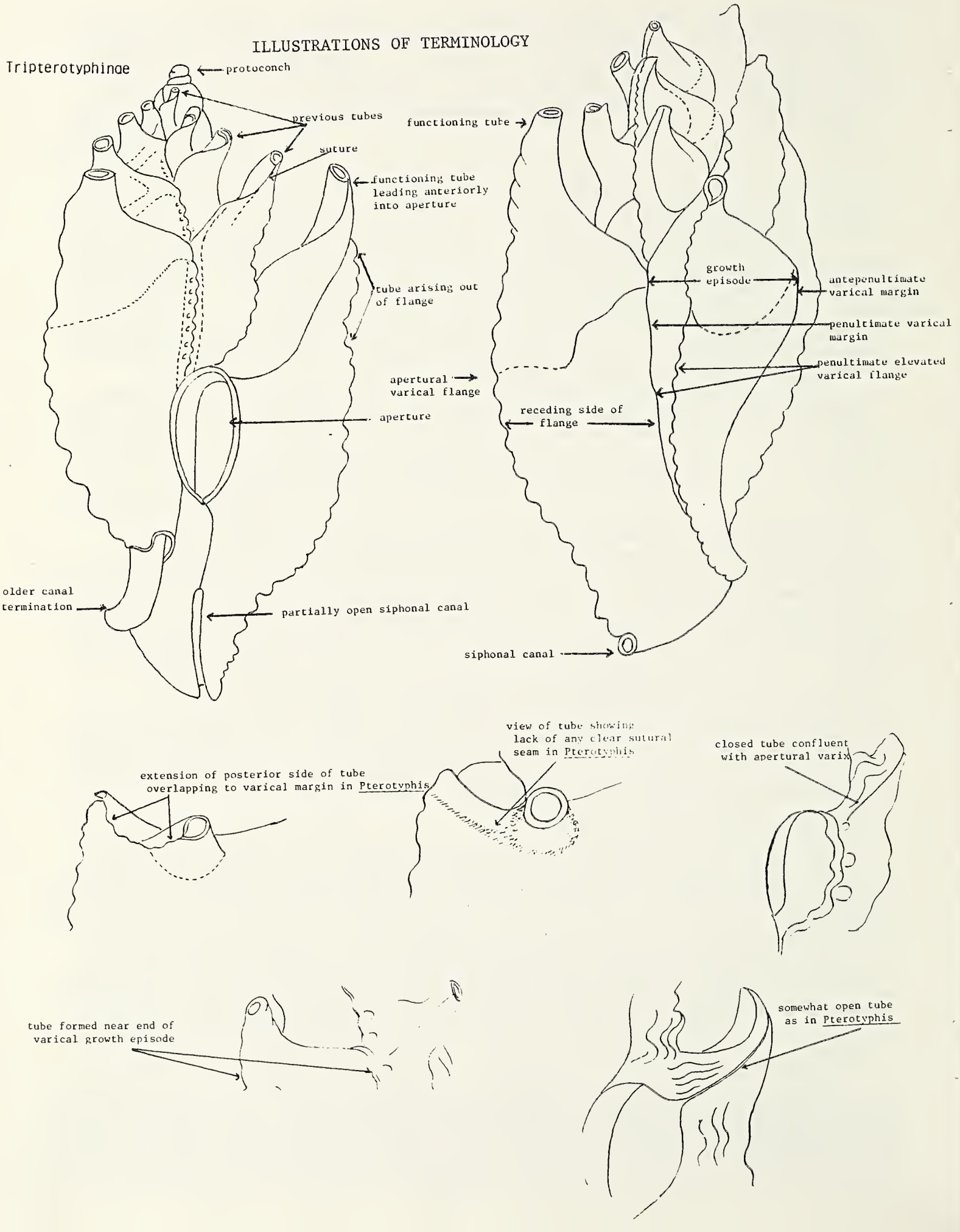
GROWTH AND MORPHOLOGY OF TYPHIDAE

The shells of the Typhidae are dextrally coiled, small species of less than 50 mm. It has been noted by Clarkson (1984:8) that they are sexually dimorphic with the females larger. With the exception of *Distichotyphis*, they vary as a family in having from three to six varices; one lineage having three varices, the remaining mostly four.

The aperture is moderately erect in most species, extremely so in *Typhina disjuncta* in which it extends funnel-like beyond the shell. The sculpture may be evident as a single varical shoulder spine or as a series of such as on the varix of *Hirtotyphis horridus*. The backward recurving of the varical flange, noticeable in Muricidae, is sometimes reversed in Typhidae as can be seen in *Monstrotyphis tosaensis*. The overall shell form varies from the slender *Typhina disjuncta* and *Monstrotyphis tosaensis* to the extremely broad *Talityphis obesus* and *T. latipennis*.

The sculptural elements in the family, which vary from simple to complex, are distinguished by the presence of a tube on the shoulder open to the aperture, which is formed directly following the protoconch, in the earliest stages of the teleoconch, and is generally accepted to serve as an anal sulcus. Each previous aperture still displays a tube, but it is sealed from within after the newest tube is formed. These

ILLUSTRATIONS OF TERMINOLOGY



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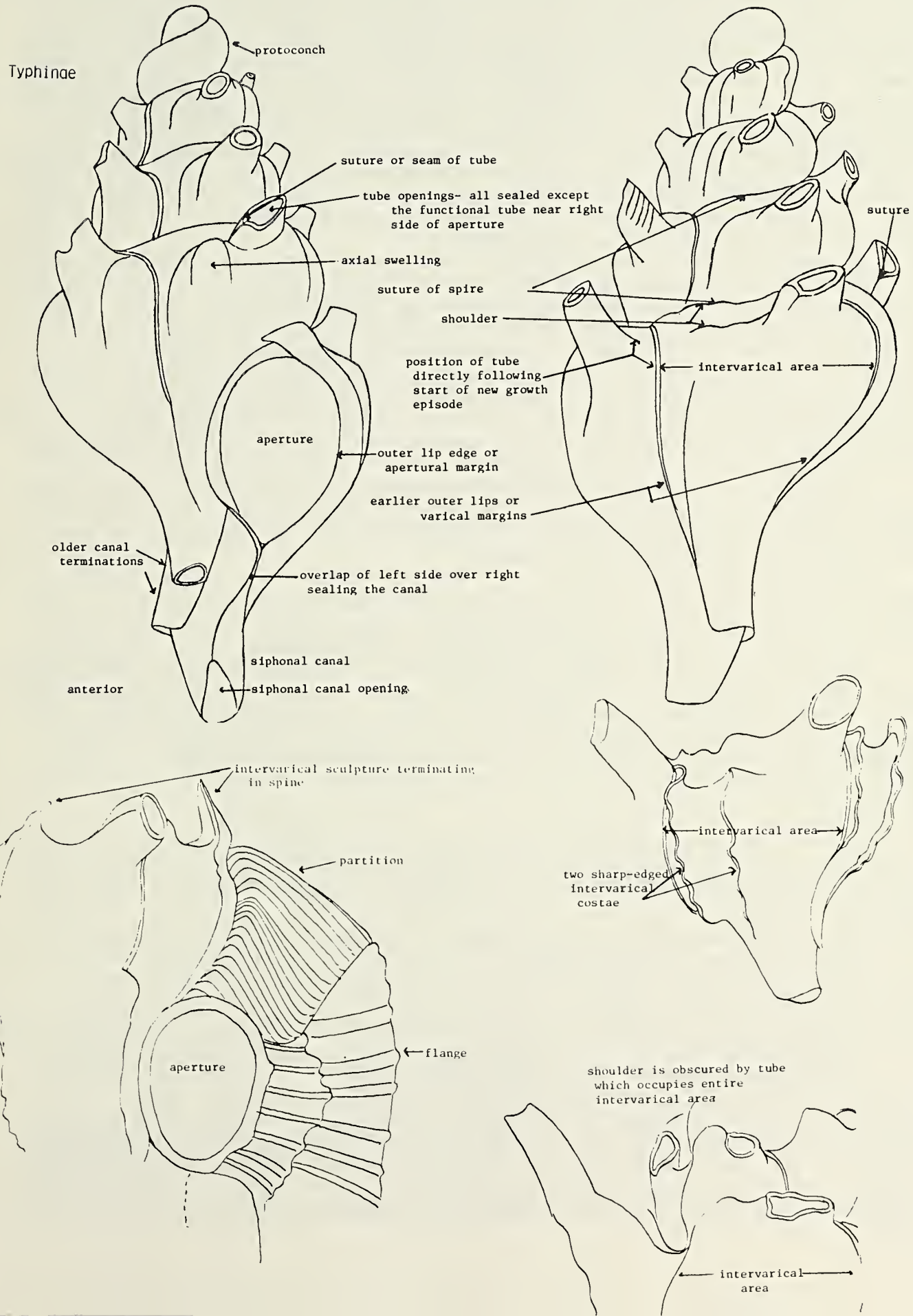

old tubes are often broken or worn but can still be recognized as tubes rather than spines. The tubes display the seam or suture where closure takes place (Gemmell and D'Attilio, 1979). However, if the growing tip is damaged or broken an extension, appearing to be constructed from within, shows no sutural line. The number of tubes in typhid species varies from three to five, with four being most common. The tube openings are commonly round, but may be oval or irregularly ovate. The appearance of the tube is immediately present in the first postnuclear whorl, seeming to indicate that it is an important functional character and not merely a sculptural element. As noted, Montfort suggested the tube was a functional character and Dall (1889:215) agreed that the open tube might serve as an anal sulcus. Few taxonomic conclusions can be drawn regarding the direction, slant or curve of the tube. They are irregular, not only among different species but may even show variation from whorl to whorl on a single species.

In Typhinae the tube openings into the varix are consistently located on the leading side of the varical margin while in the Tripterotyphinae the tube openings appear abaperturally, or on the back side of the apertural varix. This is interpreted as a significant taxonomic character separating the two subfamilies. It indicates a difference in growth, with the Typhinae forming the tube at the beginning of a growth episode and the Tripterotyphinae forming the tube at the completion of a period of growth. Designations of genera in Typhidae, however, are provisional since the genera are not based on biological considerations but on sculptural features of the intervarical area, such as the closeness of the protruding part of the tube to the varical sculpture.

Some members of the family Typhidae possess an intritacalx, which is evident when the shells have not suffered from abrasion or overcleaning. The intritacalx is most highly developed in the Tripterotyphinae in which it displays a microsculpture, differing in individual species.

The protoconch in the Recent typhid species studied by us varies from the usually convex conical 1½ to 2½ smooth or polished whorls in Typhinae to the sometimes tabulate forms found in Tripterotyphinae. The figures of the protoconchs studied for this paper appear with the species' illustrations.

The operculum in the Typhidae is Muricinae with a basal nucleus. The radulae vary widely in this family. In Tripterotyphinae, the radula is close to Muricopsinae with an arched rachidian tooth bearing five cusps, the central tooth larger, the lateral teeth similar but smaller, and the intermediates smaller still. In the Typhinae, the radulae are inconsistent and may indicate lineages that are still highly speculative.

TRIPTEROTYPHINAE

Note: Although *Pterotyphis* has priority chronologically over *Tripterotyphis*, we have chosen Tripterotyphinae as the subfamily because it indicates clearly its trivaricate nature.

Pterotyphis Jousseaume, 1880 [= *Trigonotyphis* Jousseaume, 1881] type species (O.D.) *Typhis pinnatus* Broderip, 1833

?Semityphis Martin, 1931, type species (O.D.) *Semityphis incisus* Martin, 1931 [E.H. Vokes, pers. comm.]

Tripterotyphis Pilsbry and Lowe, 1932, type species (O.D.) *Typhis lowei* Pilsbry, 1932 [=*Nothotyphis* Fleming, 1962 (type species (O.D.) *Pterynotus (Nothotyphis) norfolkensis* Fleming, 1962). See Ponder, 1972]

Prototyphis Ponder, 1972, type species (O.D.) *Typhis angasi* Crosse, 1863

In the Tripterotyphinae the genera have a trivaricate shell with a modified spine-like tube at the shoulder. In *Tripterotyphis*, *Prototyphis* and *?Semityphis* it is confluent with what would be a varical spine in the Muricidae. This structure differs however from a spine formed during closure. This spine-like tube is sealed in *Tripterotyphis* along its entire length and it opens into the body cavity at the aperture.

In Tripterotyphinae the canal may be open or sealed and is sometimes open on its distal or anterior end or open centrally. The method of canal closure in this family is variable as well. It may close as in Typhinae (by extending the left side on the canal margin over the right side) or from both sides as in *Ocenebra*. Or, as in *Tripterotyphis lowei*, it can be both overlapping, open, and contiguous at its anterior end, sometimes all in one specimen.

In *Prototyphis* the tube is somewhat open along its length when immature and only microscopically so when fully mature and, as in *Tripterotyphis*, opens into the aperture. *Prototyphis* often resembles an immature *Pterochelus* Jousseaume, 1880, family Muricidae. However, the open spine in the mature *Pterochelus* is blocked off, or sealed, from the body cavity by a wall or series of upthrusted growths (D'Attilio and Myers, 1983:101). We, therefore, conclude that the spine in *Pterochelus* and similarly formed Muricidae is a sculptural element and nonfunctioning in the sense of the typhid tube, which remains open to the body cavity. We can only speculate on whether or not a common ancestor exists for *Prototyphis* and *Pterochelus*. The typhid characters, however, are evident in *Prototyphis* as shown by Ponder (1972) in his taxonomic study. Interestingly, the protoconch of *Prototyphis* and its congeners is tabulate while that of *Pterochelus* is conical. In the Tripterotyphinae the protoconch is most often convex and of 1½ to 2 smooth whorls.

In *Pterotyphis* the tube is sealed along its length and the protruding end is somewhat distant from the varical margin, nearly midway to the preceding varix. Strong spiral sculpture of scabrous lamellae is present in this genus. The siphonal canal is barely open and is seen as a narrow slit.

The characteristics of the radulae in this group are like those of the Muricopsinae, with the entire rachidian showing a tendency of the large central tooth to project and arch. Illustrated herein are the radulae of the following Tripterotyphinae species.

Prototyphis angasi (Crosse, 1863) (Figure 1)
Tripterotyphis fayae Keen & Campbell, 1964 (Figure 2)
Pterotyphis zelandica iredalei (Fleming, 1962) (Figure 3)
Tripterotyphis lowei (Pilsbry, 1931) (Figures 4 and 5)
Tripterotyphis norfolkensis (Fleming, 1962) (Figure 6 after Ponder, 1972)

TYPHINAE

In the Typhinae we have placed the remaining twenty genera except *Cinclidotyphis* and *Distichotyphis*, which may require groups of their own and are not included in the Typhinae. Members of the Typhinae have an aperture which is entire, usually with a projecting peristome and no sulcus. There are usually four or more varices per whorl, either winglike or with heavy axial swellings; and, as in Tripterotyphinae, only the current anal tube is functional, with the older tubes sealed. Spiral sculpture, when present, is poorly developed. In some genera the shell surface is wrinkled horizontally, vertically or haphazardly. This modification of sculpture of the shell surface is not present in the family Muricidae with the exception of the genus *Vitularia* in which the surface is malleated.

The Typhinae are distinguished by having a closed siphonal canal formed by an extension of the left side of the margin of the canal, which overlaps the right side.

Of the species of Recent Typhinae examined in which the protoconch was well-preserved, the nucleus usually consists of 1½ to 2 convex whorls with very little difference in diameter between the apex, usually sunken, and the remainder of the nucleus. The protoconch is lustrous, ranging from off-white in color to pale ochre-yellow to amber. At its transition into the teleoconch, there is a defined axial ridge followed almost immediately by the first tube. Some well-preserved fossil Typhinae have more than 2 protoconch whorls and are illustrated with the figures of the species.

Whereas the radulae in the Tripterotyphinae are consistently Muricopsinae in

character, the radulae in Typhinae are highly diverse. Because live material in the Typhinae is scarce, not enough radulae were obtained to attempt to group them in any logical order relative to evolutionary origin. The diverse nature of the radulae, however, can be seen in the species illustrated here. In some cases, such as *Trubatsa pavlova* (Iredale, 1936) and *Typhisala grandis* (A. Adams, 1855), the arrangement and number of teeth are not even consistent on the same ribbon and the radula of *Typhisopsis coronatus* (Broderip, 1833) from the Gulf of California cannot be compared to anything else we have seen in the Typhidae. Species referred to *T. coronatus* from the Galapagos Islands have a different radula than those from the Gulf of California. Also shown herein are the radulae of specimens of the following arranged alphabetically by species.

Laevityphis bullisi (Gertman, 1969) (Figure 7 after Bayer, 1971)
Typhisala clarki (Keen and Campbell, 1964) (Figure 8)
Typhina cleryi (Petit, 1840) (Figure 9)
Typhisopsis coronatus (Broderip, 1833) (Figure 10)
Haustellotyphis cumingii (Broderip, 1833) (Figure 11 after Thiele, 1929)
Trubatsa erythrostigma (Keen and Campbell, 1964) (Figure 12)
Talityphis expansus (Sowerby, 1874) (Figure 13 after Bayer, 1971)
Typhisala grandis (A. Adams, 1855) (Figure 14)
Typhina philippensis interpres (Iredale, 1924) (Figure 15 after Ponder, 1972)
Talityphis latipennis (Dall, 1919) (Figure 16)
Trubatsa longicornis (Dall, 1888) (Figure 17 after Bayer, 1971)
Cinclidotyphis myrae (DuShane, 1969) (Figure 18 after Radwin and D'Attilio, 1976)
Trubatsa pavlova (Iredale, 1936) (Figure 19)
Talityphis perchardei Radwin and D'Attilio, 1976 (Figure 20)
Typhinellus sowerbii (Broderip, 1833) (Figure 21)
Siphonochelus syringianus (Hedley, 1903) (Figure 22)
Monstrotyphis tosaensis (Azuma, 1960) (Figure 23 after Azuma, 1960)
Typhina yatesi (Crosse and Fischer, 1865) (Figure 24)

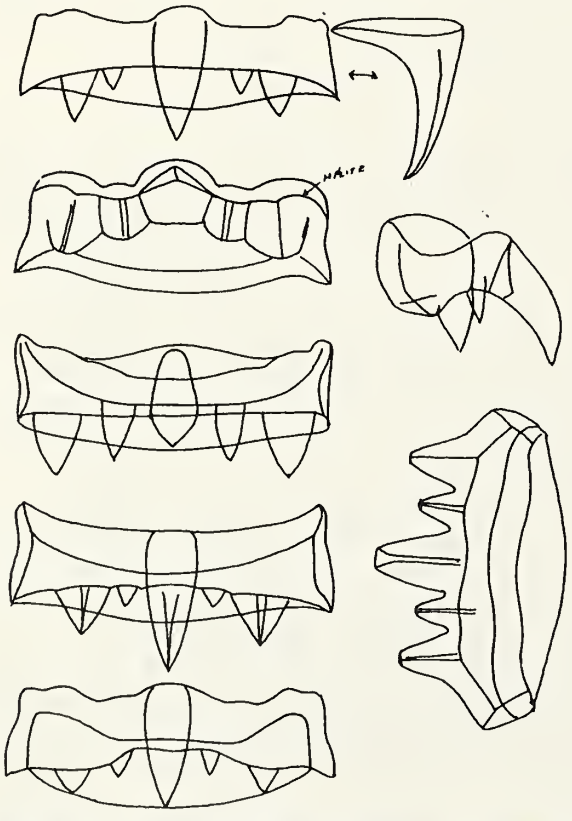

Figure 1. *Prototyphis angasi*, SDNHM 24026
Port Jackson, S. Australia

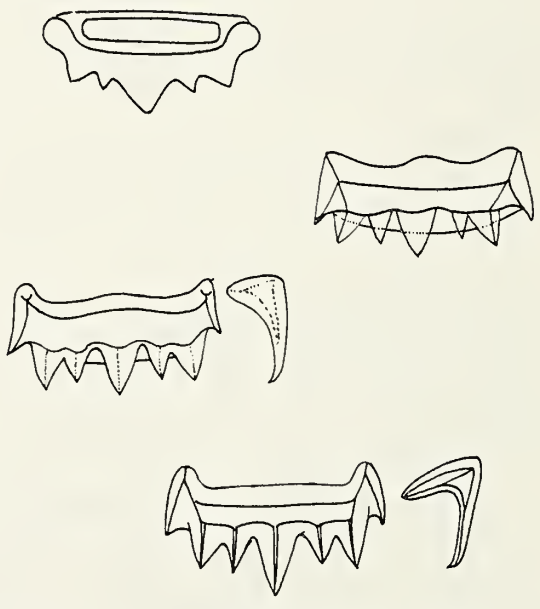

Figure 2. *Tripterotyphis fayae*,
Tenacatita Bay, Jalisco, Mexico
D. Shasky coll.

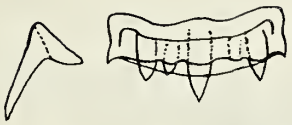

Figure 3. *Prototyphis zelandica iredalei* [after Ponder 1972] Norfolk Island

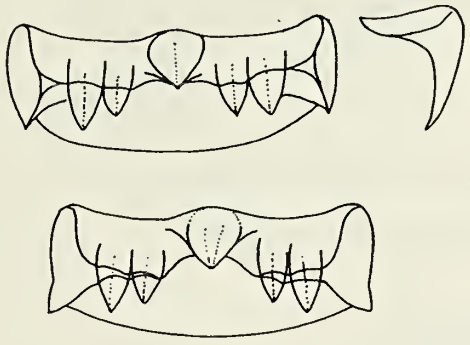

Figure 5. *Tripterotyphis lowei*
Pulmo Reef, Baja California, Mexico
D. Shasky collection

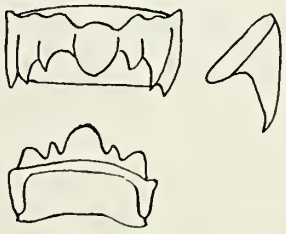

Figure 6. *Tripterotyphis norfolkensis* [after Ponder, 1972] Norfolk Island

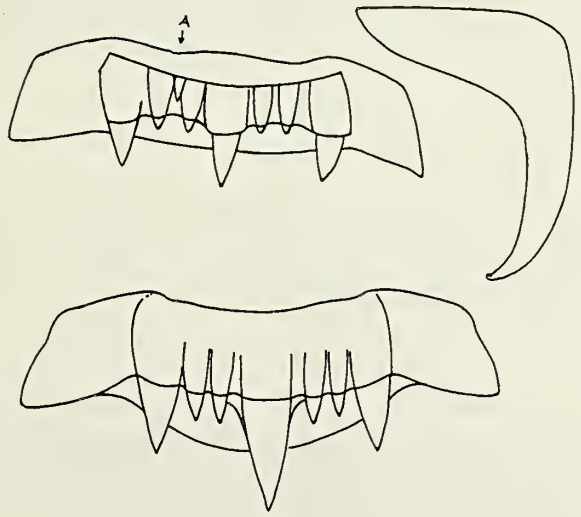

Figure 8. *Typhisala clarki*,
Pta. San Felipe, Baja California Norte, Mexico. Coll. J. Gemmell

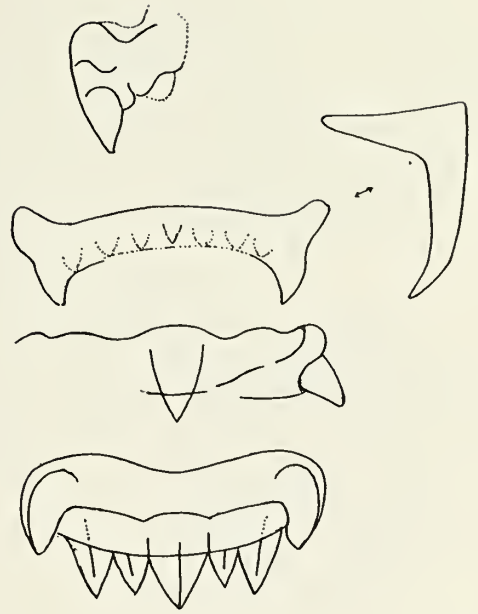

Figure 4. *Tripterotyphis lowei*
SDNHM 56709, Sombrero Island, Galapagos Is., Ameripagos Expedition

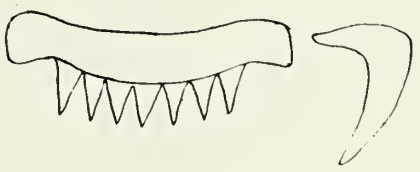

Figure 7. *Laevityphis bullisi* [after Bayer, 1971]

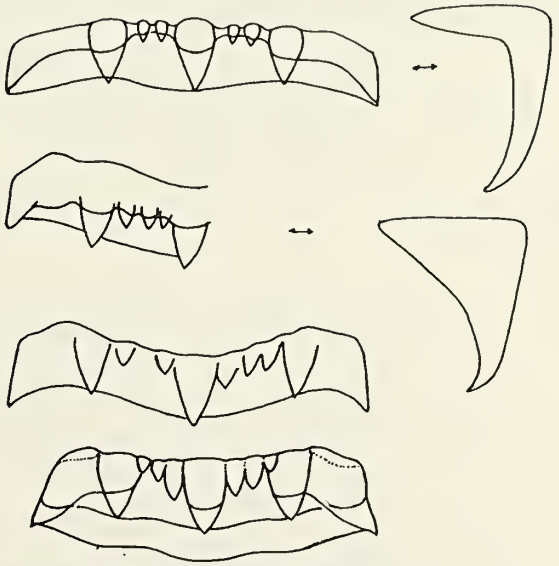

Figure 9. *Typhina cleryi*
Joatinga, E. of Rio, in 40 m

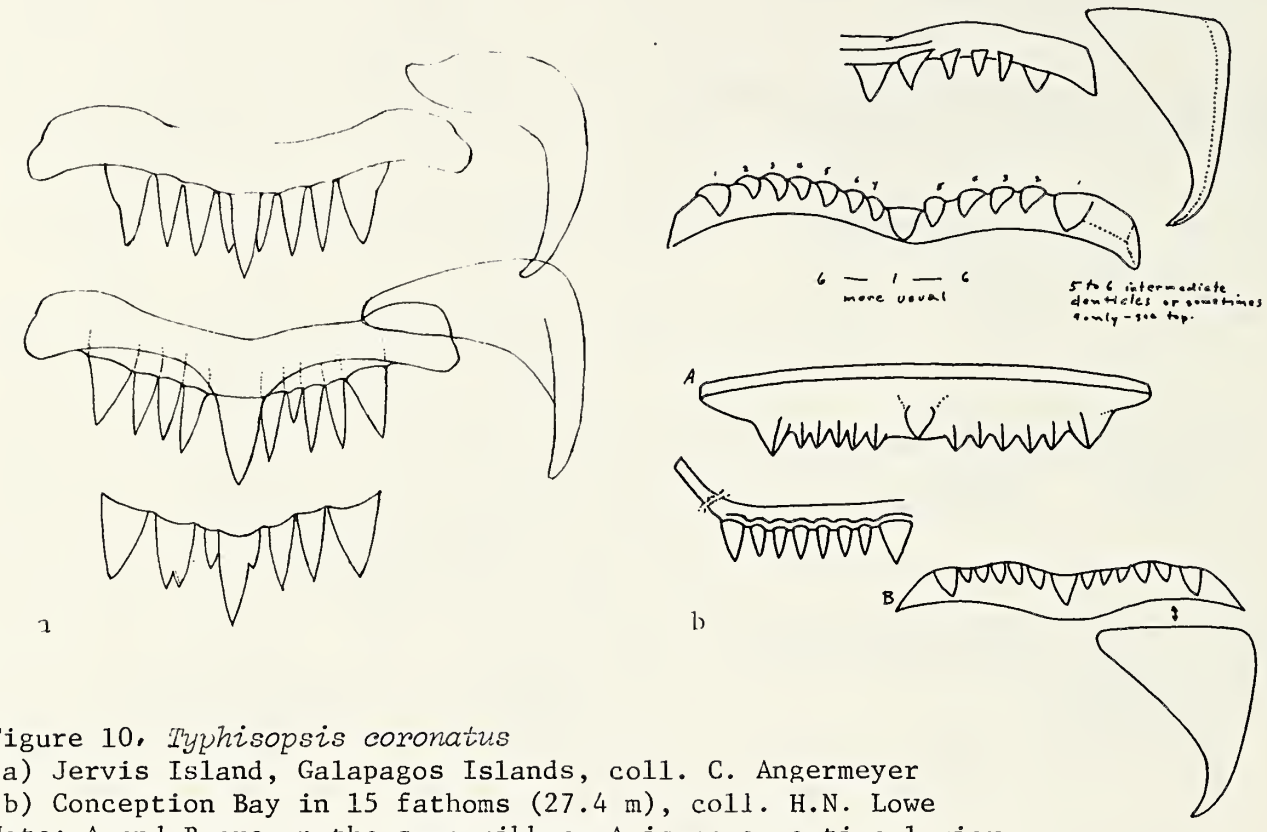

Figure 10. *Typhisopsis coronatus*
(a) Jervis Island, Galapagos Islands, coll. C. Angermeyer
(b) Conception Bay in 15 fathoms (27.4 m), coll. H.N. Lowe
Note: A and B are on the same ribbon, A is an exceptional view and B is the more usual wing-like shape.

Figure 11. *Haustellotyphis cumingii* [after Thiele, 1929]

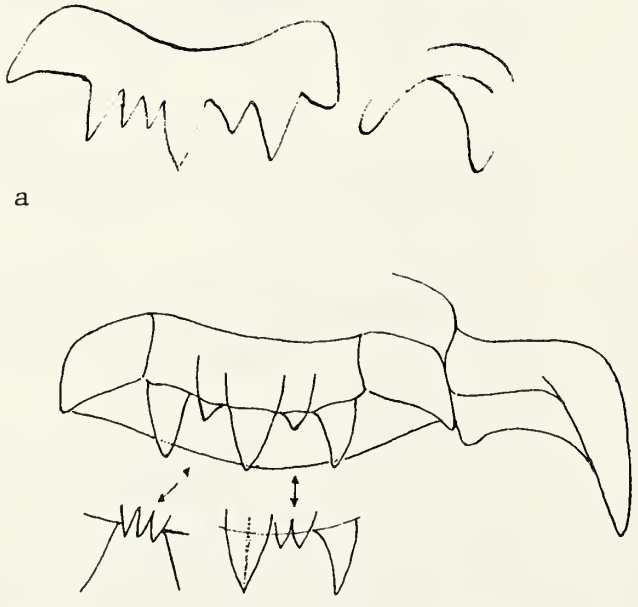

Figure 13. *Talityphis expansus* [after Bayer, 1971]

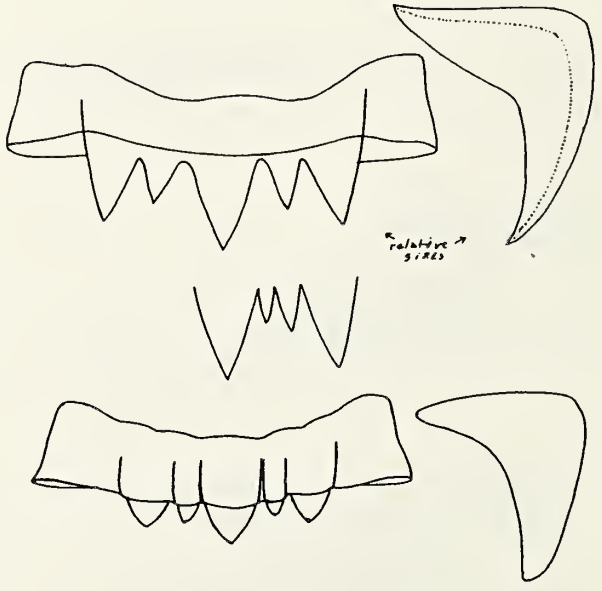

Figure 12. *Trubatsa erythrostigma*, holotype, Moreton Bay, Queensland, Australia. Normally a 5-cusped tooth but at times with an occasional extra denticle

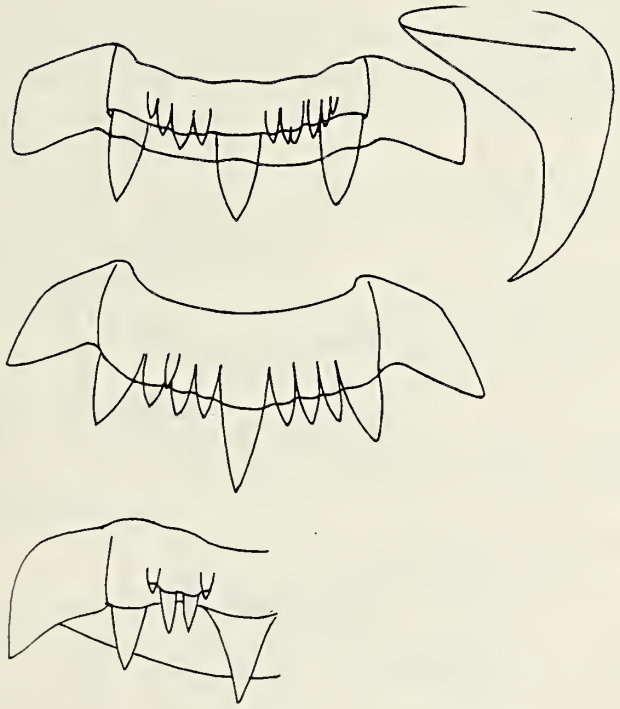

Figure 14. *Typhisala grandis*, Banderas Bay, Mexico in 15 fm. (27.4 m) Coll. J. McLean

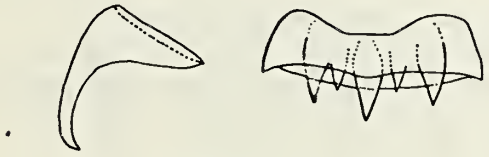

Figure 15. *Typhina philippensis interpres* [after Ponder, 1972] off Montagu Island, N.S.W., Australia

Figure 17. *Trubatsa longicornis* [after Bayer, 1971]

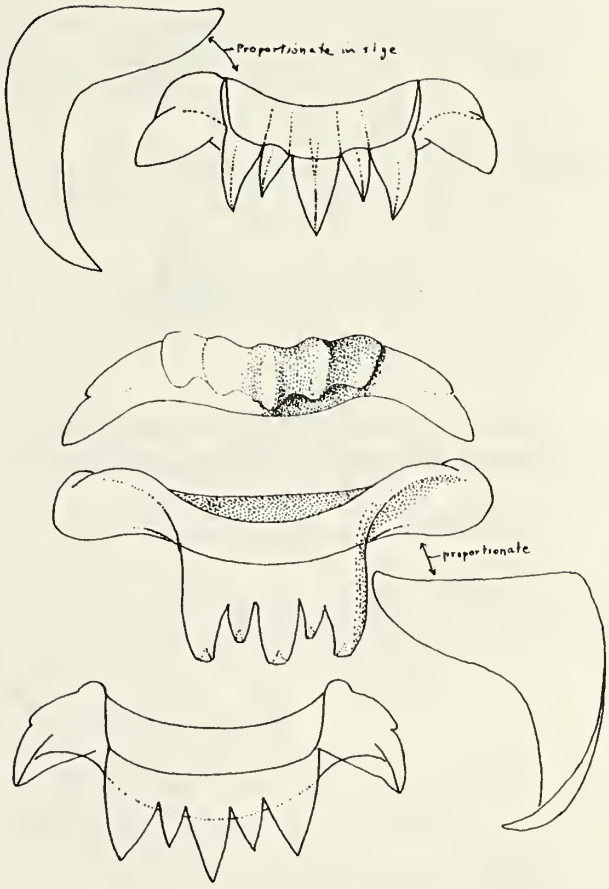

Figure 16. *Talityphis latipennis*, L.J. Bibbey collection

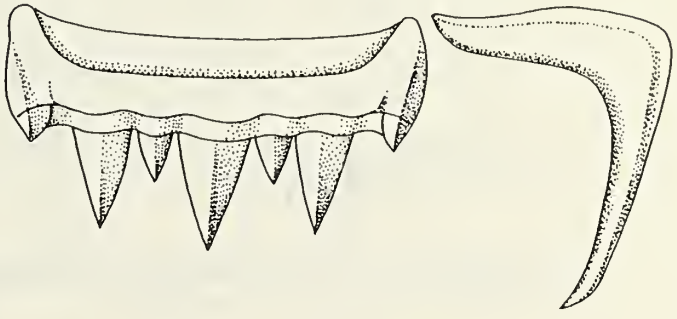

Figure 18. *Cinclidotyphis myrae* [after Radwin and D'Attilio, 1976]

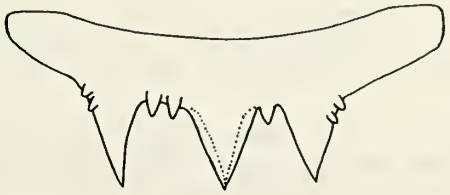

Figure 19. *Trubatsa pavlova* off Cape Moreton, Queensland, Australia. Coll. T. Nielson

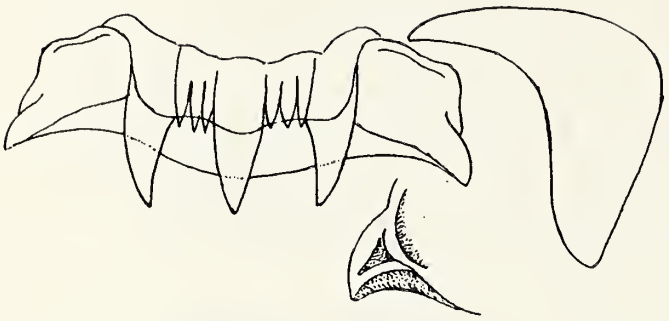

Figure 20. *Talityphis perchardei*, Bocas Island, Trinidad, coll. P. Perchard

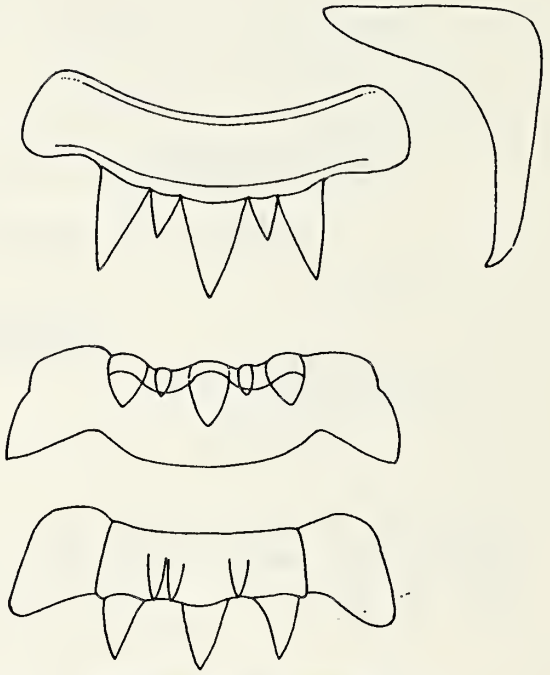

Figure 21. *Typhinellus sowerbii* off Canary Islands, Coll. P. Clover
There are either one or two denticles on one side or the other, usually 1 and 1; 2 and 1; 1 and 2

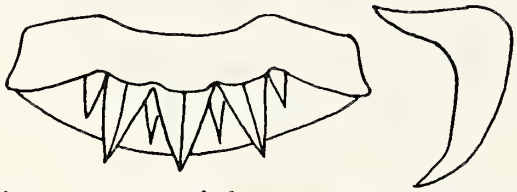

Figure 22. *Siphonochelus syringianus* Spencer Gulf, S. Australia

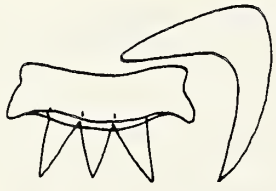

Figure 23. *Monstrotyphis tosaensis* [after Azuma, 1960] Tosa Bay, Shikoku, Island, Japan

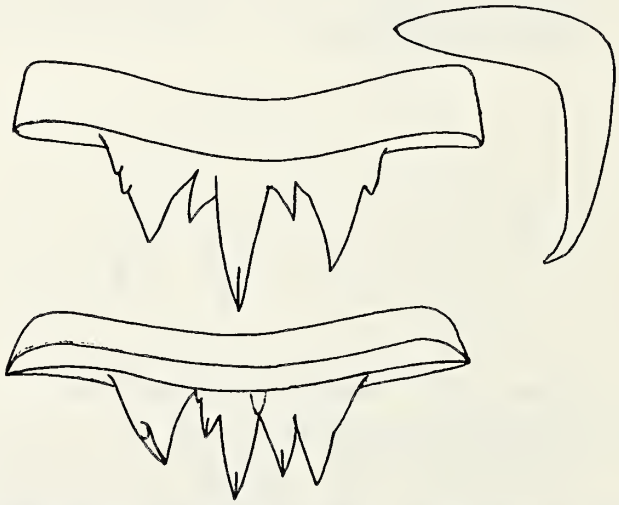

Figure 24. *Typhina yatesi*, Cape St. Vincent, S. Australia

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Note: Since the literature citations for each nominal species in Typhidae appear in the catalogue with the appropriate species entries, only those references cited in the text and/or secondary references in the catalogue are included here.

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1984. *Spondylus tenellus* (Reeve, 1856) and *Tripterotyphis robustus* (Verco, 1895): an unusual relationship. Aust. Shell News 46:8, 1 fig. (April)

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1903. Essais de Paléoconchologie comparée 5, 215 pp., 9 pls.

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1889. Reports on the results of dredging...by the U.S. Coast Guard Survey Steamer "Blake"... Bull. Mus. Comp. Zool. 18:1-492, pls. 10-40

D'ATTILIO, ANTHONY

1975. The typhine shell: theme development and elaboration. Festivus 6(9): 53-60, figured (September)

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1985. Illustrations and comments on *Typhina yatesi* (Crosse, 1865). Conchologists of America Bull. 13(3):38-39, figs. 1, 2 (September)

1987. *Typhisopsis coronatus* and dwarf *Typhisala grandis* at Costa Rica. Festivus 19(4):32-35, 11 figs. (April)

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1984. *Tripterotyphis lowei* from Broome, West Australia with information on the known distribution of its nominal subspecies. Festivus 16(5):50-53, 7 figs. (May)

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1970. Observation of *Typhis* at San Felipe. Festivus 1(11):3-4 (November)

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GERTMAN, RICHARD L.
1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the Western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (December 29)

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1880. Division methodique de la famille des Purpurides. Le Naturaliste, Annee 2(42):335-336 (December 15)

KEEN, A. MYRA
1944. Catalogue and revision of the gastropod subfamily Typhinae. Jour. Paleo. 18(1):50-72, 19 figs.

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1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (July 1)

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1810. Conchyliologie systematique 2:676 pp., pls. 1-161

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1972. Notes on some Australian genera and species of the family Muricidae (Neogastropoda). Jour. Malac. Soc. Aust. 2(3):215-248 (March 24)

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RUHOFF, FLORENCE
1980. Index to the species of Mollusca introduced from 1850 to 1870. Smiths. Contrib. Zool., No. 294. Smiths. Inst. Press, Washington, D.C., 640 pp.

SACCO, F.
1904. I Molluschi dei terziarii del Piemonte e della Liguria, pt. 30. 203 pp., 31 pls. (August)

SHERBORN, C.D.
1902-33. *Index Animalium*. London. Section 2, parts 1-33 (1922-33, lists names from 1800 to 1850)

SOWERBY, GEORGE B., JUN.
1841. The Conchological Illustrations *Murex*. Sowerby, London. pl. 200 [Illustrations by G.B. Sowerby II, text by G.B. Sowerby I]
1874. *in* Reeve, Conchologia Iconica, 19 *Typhis*. 3 pls.

VELLA, PAUL
1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeont. 4(3):362-391, pls. 46-47

CATALOGUE OF NOMINAL GENERA IN TYPHIDAE

The following catalogue of the 28 nominal genera in Typhidae is arranged alphabetically. The generic type and the original citation with the particular page in parentheses is listed for each genus.

GENUS-GROUP NAMES IN TYPHIDAE

Choreotyphis Iredale, 1936
Type (O.D.): *Typhina pavlova* Iredale, 1936
Iredale, Tom. 1936. Australian molluscan notes, no. 2. Rec. Aust. Mus. 19(5): 267-340, pls. 20-24 (p. 324)

Cinclidotyphis DuShane, 1969
Type (O.D.): *Cinclidotyphis myrae* DuShane, 1969
A new genus and two species of *Typhinae* from the Panamic Province (Gastropoda: Muricidae). Veliger 11(4):343-344, pl. 54, figs. 1-5 (p. 343)

Distichotyphis Keen and Campbell, 1964
Type (O.D.): *Distichotyphis vemae* Keen and Campbell, 1964
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of *Typhinae* (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (p. 56)

Eotyphis Tembrock, 1963 [proposed as subgenus of *Lyrotyphis* Jousseaume, 1880]
Type (O.D.): *Typhis sejunctus* Semper, 1861
Tembrock, Maria Luise. 1963. Muriciden aus dem Mittelund Oberoligozän... Paleont. Abh. Berlin 1(4):299-352, pls. 1-10 (p. 322)

Haustellotyphis Jousseaume, 1880
Type (O.D.): *Typhis cumingii* Broderip, 1833
Jousseaume, Félix. 1880. Division méthodique de la famille des purpurides. Le Naturaliste. Année 2(42):335-336 (p. 336)

Hirtotyphis Jousseaume, 1880
Type (O.D.): *Murex horridus* Brocchi, 1814
Jousseaume, Félix. 1880. see above (p. 336)

Indotyphis Keen, 1944
Type (O.D.): *Laevityphis (Indotyphis) bantamensis* (Oostingh, 1933)
Keen, A. Myra. 1944. Catalogue and revision of the gastropod subfamily *Typhinae*. Jour. Paleo. 18(1):50-72 (p. 59)

Laevityphis Cossmann, 1903
Type (O.D.): *Typhis coronarius* Deshayes, 1865 (=*Typhis muticus* J. Sowerby, 1834)
Cossmann, Alexandre E.M. 1903. Essais de Paléoconchologie comparee, vol. 5, 215 pp. (p. 59)

Lyrotyphis Jousseaume, 1880
Type (O.D.): *Typhis cuniculosus* Duchatel (*in* Bronn), 1848 (=*Murex cuniculosus* Nyst, 1836)
Jousseaume, Félix, 1880. Division méthodique de la famille des purpurides. Le Naturaliste. Année 2(42):335-336 (p. 336)

Monstrotyphis Habe, 1961
Type (O.D.): *Typhis (Typhinellus) tosaensis* Azuma, 1960
Habe, Tadashige. 1961. Coloured illustrations of the shells of Japan, Hoikusha, Ozaka, Japan. 183 pp. + append. 1-42, 66 pls. and text figs. (p. 19 append.)

Neotyphis Vella, 1961
Type (O.D.): *Typhis tepunga* [sic] Fleming, 1943 = *Typhis tepungai* Fleming, 1943
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeont. 4(3):362-391, pls. 36-47, 6 text figs. (p. 385)

Nothotyphis Fleming, 1962
Type (O.D.): *Pterynotus (Nothotyphis) norfolkensis* Fleming, 1962
Fleming, C.A. 1962. The genus *Pterynotus* Swainson (Gastropoda, family Muricidae) in New Zealand and Norfolk Island. Trans. Roy. Soc. New Zealand (Zoology)2(14):109-119 (pp. 116-117)

Pilsbrytyphis Woodring, 1959
Type (O.D.): *Typhis gabbi* Brown and Pilsbry, 1911
Woodring, Wendell P. 1959. Geology and Paleontology of Canal Zone and adjoining ports of Panama... Geol. Surv. Prof. Paper 306-B:147-239, pls. 24-38 (p. 220)

Ponderia Houart, 1986
Type (O.D.): *Typhis zelandica* Hutton, 1873
Houart, Roland. 1986. *Ponderia* gen. nov. with discussion of related genera and description of *Ponderia abies* sp. nov. (Gastropoda: Muricidae: Muricinae) Apex 1(3):88-92, figs. 1-4 (pp. 88-90)

Prototyphis Ponder, 1972
Type (O.D.): *Typhis angasi* Crosse, 1863
Ponder, Winston, F. 1972. Notes on some Australian genera and species of the family Muricidae. Jour. Malac. Soc. Aust. 2(3):215-265, pls. 20-25 (pp. 221-222)

Pterotyphis Jousseaume, 1880
Type (O.D.): *Typhis pinnatus* Broderip, 1833
Jousseaume, Félix. 1880. (as *Perotyphis*) Division méthodique de la famille des purpuridés. Le Naturaliste Année 2 (42):335-336 (p. 336), errata as above, (46): 367 (correction of *Perotyphis*, a typographical error, to *Pterotyphis)*

Rugotyphis Vella, 1961
Type (O.D.): *Typhis francescae* Finlay, 1924
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeont. 4(3):362-391, pls. 46, 47 (p. 376)

Semityphis Martin, 1931
Type (O.D.): *Semityphis incisus* Martin, 1931
Martin, Karl. 1931. Mollusken aus dem obereocän von Nanggulan. Dienst van der Mijnbouw in Neder.-Indië. Wetens. Meded. 18:1-56, pls. 1-7 (p. 31)

Siphonochelus Jousseaume, 1880
Type (O.D.): "*Typhis avenatus* Hinds, 1843" (=*T. arcuatus* Hinds, 1843)
Jousseaume, Félix. 1880. Division méthodique de la famille des purpuridés. Le Naturaliste. Année 2 (42):335-336 (p. 335), errata, same as above (46):367

Talityphis Jousseaume, 1882
Type (O.D.): *Typhis expansus* Sowerby, 1874
Jousseaume, Félix. 1882. Étude des Purpuridae et description d'espèces nouvelles. Revue et magazin de zool. pour 1879. Année (3)7:314-348 (p. 338)

Trigonotyphis Jousseaume, 1882
Type (O.D.): *Typhis fimbriatus* A. Adams, 1854
Jousseaume, Félix. 1882. same as above

Tripterotyphis Pilsbry and Lowe, 1932
Type (O.D.) *Typhis lowei* Pilsbry, 1931
Pilsbry, Henry A., and Herbert N. Lowe, 1932. West Mexican and Central American mollusks collected by H.N. Lowe, 1929-31. Proc. ANSP 84:33-144, pls. 1-17 (p. 78)

Trubatsa Dall, 1889
Type (S.D.): *Typhis (Trubatsa) longicornis* Dall (*in* Agassiz), 1888
Dall, William H. 1889. Reports on the results of dredging under...Agassiz, in the Gulf of Mexico...and in the Caribbean Sea...by the..."Blake"... Report on the Mollusca, Pt. 2. Gastropoda and Scaphopoda. Bull. MCZ Harvard 18:1-492, pls. 10-39 (p. 216)

Typhina Jousseaume, 1880
Type (O.D.): *Typhis belcheri* Broderip, 1833
Jousseaume, Félix. 1880. Division méthodique de la famille des purpurides. Le Naturaliste, Année 2(42):335-336 (p. 335)
Typhinellus Jousseaume, 1880
Type (O.D.): *Typhis sowerbyi* [sic] Broderip, 1833 (=*Typhis sowerbii* Broderip, 1833)
Jousseaume, Félix. 1880. see above
Typhis Montfort, 1810
Type (O.D.): *Purpura tubifer* Bruguière, 1792
Montfort, Denys de. 1810. Conchyliologie systématique et classification méthodique des coquilles. vol. 2, Coquilles univalves, non cloisonees. Paris. 676 pp., pls. 1-161 (p. 287)
Typhisala Jousseaume, 1881
Type (O.D.): *Typhis grandis* A. Adams, 1855
Jousseaume, Félix. 1881. Étude des Purpuridae et description d'espèces nouvelles. Revue et magazin de zool. pour 1879. Année 3(7):314-348 (p. 339)
Typhisopsis Jousseaume, 1880
Type (O.D.): *Typhis coronatus* Broderip, 1833
Jousseaume, Félix. 1880. Division méthodique de la famille des Purpurides. Le Naturaliste. Année 2(42):335-336 (p. 335)

CATALOGUE OF NOMINAL RECENT AND FOSSIL SPECIES IN TYPHIDAE

The following catalogue of the nominal species in the family Typhidae is arranged alphabetically by species. Fossil species are indicated by an asterisk. Each species is listed with its original orthography and citation, the page and figure for each species appearing in parentheses. No synonymies are given.

Most of the original references were examined by us; those which were not are indicated by "not seen." The type locality is given for Recent species and the age and locality for the fossils.

Current generic assignments are included with an abbreviation in brackets indicating the authority consulted. Where no abbreviation appears (except in the case of generic type), the assignment is ours. Following are the authorities consulted.: Keen, 1944 [K]; Vella, 1961 [V]; Keen and Campbell, 1964 [KC]; Gertman, 1969 [G]; E.H. Vokes, 1971 [EV]; Radwin and D'Attilio, 1976 [RD]. For the age and current generic determination of the fossil species we have relied on Dr. E.H. Vokes.

SPECIES-GROUP NAMES IN TYPHIDAE

abies Houart, 1986. *Ponderia*
Houart, Roland. 1986. *Ponderia* gen. nov. with discussion of related genera and description of *Ponderia abies* sp. nov.
Apex 1(3):88-92, figs. 1-4 (pp. 90-91, figs. 3, 3a)
Recent: off Newcastle, N.S.W., Australia
Ponderia [doubtfully different from *Prototyphis*]
**acanthopterus* Tate, 1888. *Typhis*
Tate, Ralph. 1888. The gastropods of the older Tertiary of Australia
Trans. & Proc. Roy. Soc. S. Aust. 10:91-176, pls. 1-13 (p. 92, pl. 1, fig. 2)
Middle Miocene: Australia
Typhinellus [EV]
**aculeatus* Vella, 1961. *Typhis (Hirtotyphis)*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46-47, 6 text figs. (p. 383-384, pl. 46, figs. 1,3)
Lower Miocene: New Zealand
Hirtotyphis

**acuticosta* Conrad, 1830. *Murex*
Conrad, Timothy A. 1830. On the geology and organic remains of a part of the peninsula of Maryland. Jour. ANSP (ser. 1) 6:205-230, pls. 9-10 (p. 217, pl. 9, fig. 1) [not seen]
Upper Miocene: Maryland
Talityphis [G, EV]

**adventus* Vella, 1961. *Typhis (Typhis)*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46-47, 6 text figs. (pp. 380-381, pl. 47, fig. 23, text figs. 4,8)
Lower Miocene: New Zealand
Typhis [V, EV]

**alatus* Sowerby, 1850. *Typhis*
Sowerby, George B. (1st) 1850. (*in* J.C. Moore, On some Tertiary beds in the Island of San Domingo), Descriptions of new species of fossil shells found by J.S. Heniker, Esq. Quart. Jour. Geol. Soc. London 6:43-53, pls. 9-10 (p. 48, pl. 10, fig. 4)
Lower Pliocene: Dominican Republic (+ Panama, Ecuador)
Talityphis [G, EV]

**alternata* Lea, 1833. *Murex*
Lea, Isaac. 1833. Contributions to Geology. Philadelphia. 227 pp., 6 pls. (p. 157, pl. 5, fig. 163)
Middle Eocene: Alabama
Laevityphis [EV]

angasi Crosse, 1863. *Typhis*
Crosse, Hippolyte. 1863. Description d'espèces nouvelles d'Australie. Jour Conchyl. 11(1):84-90, pl. 1 (p. 86, pl. 1, fig. 2)
Recent: Port Jackson, Australia
Prototyphis (Type)

**antiquus* Gabb, 1864. *Typhis*
Gabb, William M. 1864. Description of the Cretaceous fossils. Palaeontology of Calif. 1(4):55-236 (*fide* Ruhoff, 1980) 32 pls. (p. 82, pl. 18, fig. 31)
"Cretaceous:" Martinez, Calif. (Middle or Upper Eocene)
Laevityphis [K, EV]

aotanus Vella, 1961. *Typhis (Hirtotyphis)*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46-47, 6 text figs. (p. 384, pl. 46, fig. 2)
Upper Miocene: New Zealand
Hirtotyphis [EV]

arcana DuShane, 1969. *Pterotyphis (Tripterotyphis)*
DuShane, Helen. 1969. A new genus and two new species of Typhinae from the Panamic Province (Gastropoda, Muricidae). Veliger 11(4):343-344, pl. 54 (p. 344, pl. 54, figs. 4-6)
Recent: Mazatlán, Sinaloa, Mexico
Tripterotyphis [RD]

arcuatus Hinds, 1843. *Typhis*
Hinds, Richard B. 1843. On new species of shells collected by Sir Edward Belcher. Proc. Zool. Soc. London (1843):17-19 [Figured: Hinds (1844) Voyage of HMS Sulphur, p. 10, pl. 3, figs. 1,2]
Recent: Cape of Good Hope
Siphonochelus (Type)

arcuatus Tenison-Woods, 1877
["*Typhis arcuatus* sp. n., J.E.T. Woods, P.R. Soc. Tasm., 1876. p. 4, Tasmania." Error in Zoological Record for 1876 (Vol. 13, Moll. 21), for report of *arcuatus* Hinds. For further note see Keen (1944)]

avenatus [sic] Hinds, 1843. [misspelling in Jousseaume (1880) = *T. arcuatus* Hinds, 1843]

**bantamensis* Oostingh, C.H. 1933. *Typhis (Typhinellus)*
Oostingh, C.H. 1933. Neue mollusken aus dem Pliocan von sud-Bantam (Java). De Mijningenieur, Jaarg. 14, pp. 193-197, 3 text figs. (p. 193, fig. 1) [not seen]
Pliocene: Java
Indotyphis (Type)

belcheri Broderip, 1833. *Typhis*
Broderip, W.J. 1833. [*in* Broderip, W.J., & G.B. Sowerby] Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London (1832):173-179 (p. 178). [Figured: Sowerby (1841), Conch. Illus. pt. 200, figs. 5-6]
Recent: West Africa
Typhina

bengalensis Radwin and D'Attilio, 1976. *Talityphis*
Radwin, George E., and Anthony D'Attilio. 1976. Murex shells of the world, an illustrated guide to the Muricidae. Stanford Univ. Press. 284 pp., 32 pls., 192 text figs. [appendix pp. 219-238] (pp. 234-235, figs. 186-187)
Recent: Bay of Bengal, India
Talityphis [RD]

**berauensis* Beets, 1942. *Typhis (Typhinellus)*
Beets, C. 1942. Mollusken aus dem Tertiar des Ostendischen Archipels. Leidsche Geol. Meded. 13(1):218-254, pls. 24-26 (p. 235, pl. 25, figs. 14-17)
Upper Miocene: West Borneo
Talityphis [EV]

bivaricata Verco, 1909. *Typhis*
Verco, Joseph C. 1909. Notes on South Australian marine Mollusca with descriptions of new species, part 10. Proc. Roy. Soc. S. Aust. 33:270-276, pls. 20-21 (p. 272, pl. 21, figs. 1-2)
Recent: South Australia
Typhina [RD, V]

bullisi Gertman, 1969. *Siphonochelus (Laevityphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 178, pl. 7, figs. 3a,3b)
Pleistocene: Costa Rica. Recent: Gulf of Darien, Panama
Laevityphis [G, RD]

**calhounensis* Gertman, 1969. *Pterotyphis (Pterotyphis)*
Gertman, Richard L. 1969. same as above (pp. 182-183, pl. 8, figs. 1a, 1b)
Late Lower Miocene: Florida
Pterotyphis [G, EV]

campbelli Radwin and D'Attilio, 1976. *Talityphis*
Radwin, George E., and Anthony D'Attilio. 1976. Murex shells of the world, an illustrated guide to the Muricidae. Stanford Univ. Press. 284 pp., 32 pls., 192 text figs. [appendix pp. 219-238] (pp. 235-236, figs. 188-189)
Recent: Luzon, Philippines
Talityphis [RD]

canaliferus Sowerby, Jr., 1841. *Murex*
Sowerby, George B., Jr. 1841. Descriptions of some new species of *Murex*, principally from the collection of H. Cuming, Esq. Proc. Zool. Soc. London (1840):137-147 (pp. 142-143) [Figured: Sowerby (1841) Conch. Illus., pl. 190, fig. 74]
Recent: ?Norfolk Island
Tripterotyphis

cancellatus Sowerby, Jr. 1841. *Murex* [not *M. cancellatus* Gmelin, 1791]
Sowerby, George B. Jr. 1841 Conch. Illus. *Murex*, pls. 187-199 (pl. 190, fig.79)
Recent: habitat unknown
Tripterotyphis [K]

**carmenae* Gertman, 1969. *Typhis (Talityphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (pp. 166-167, pl. 5, figs. 3a, 3b, 4a, 4b)
Middle Pliocene: Mexico
Talityphis [G, EV]

carolinae Houart, 1987. *Typhis (Typhina)*
Houart, Roland. 1987. Description of four new species of Muricidae (Mollusca: Gastropoda) from New Caledonia. Venus 46(4):202-210, 16 figs. (pp. 204-207, figs. 2, 3, 4, 12, 13)
Recent: Grand Récif Sud, New Caledonia
Typhina

**carolinensis* Olsson and Petit, 1964. *Typhis (Typhinellus)*
Olsson, Axel A., and Richard E. Petit. 1964. Some Neogene Mollusca from Florida and the Carolinas. Part 1. The geology and stratigraphy of south Florida. Part 2, Paleontology and systematic treatment. Bull. Amer. Paleo. 47(217):505-574, pls. 77-83 (p. 551, pl. 81, figs. 1-1c)
Middle Pliocene: South Carolina
Typhinellus

**cercadicus* Maury, 1917. *Typhis*
Maury, Carlotta J. 1917. Santo Domingo type sections and fossils, part 1. Mollusca. Bull. Amer. Paleo. 5(29):165-415, pls. 29-65 (p. 265, pl. 42, fig. 12)
Lower Pliocene: Dominican Republic
Siphonochelus [G, EV]

**chattonensis* Maxwell, 1971. *Typhis (Typhis)*
Maxwell, Phillip H. 1971. Notes on some Cenozoic Muricidae (Mollusca: Gastropoda) from New Zealand with a review of the genus *Poirieria* Jousseaume, 1880. New Zealand Jour. Geol. & Geophysics 14:757-781, 32 figs. (p. 777, figs. 18, 19)
Oligocene: Southland, New Zealand
Typhis [EV]

**chipolanus* Gertman, 1969. *Typhis (Typhinellus)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 155, pl. 1, figs. 4a, 4b)
Late lower Miocene: Florida
Typhinellus [G, EV]

clarki Keen and Campbell, 1964. *Typhis (Typhisopsis)*
Keen, A. Myra, and G. Bruce Campbell, 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 48, 49, pl. 9, figs. 15, 19. 23)
Recent: Venado Beach, Bay of Panama
Typhisala [RD]

claydoni Houart, 1988. *Typhisopsis*
Houart, Roland. 1988. *Typhisopsis claydoni* n. sp., a new species of Typhinae (Gastropoda: Muricidae) from Western Australia. Publ. Ocas. Soc. Portuguesa Malac. 11:39-40, figs. 1-4 (pp. 39-40, figs. 1-4)
Recent: Port Hedland, West Australia
Typhisopsis

cleryi Petit, 1840. *Murex (Typhis)*
Petit Saussaye, S. 1840. Description de deux espèces de coquilles nouvelles, appartenant aux genres *Rostellaria* et *Murex*. Revue et Mag. de Zool. 3:326-327
[Figured: same as above (1842) pl. 54]
Recent: Cap Saint-Thomas (Brazil)
Typhina

**clifdenensis* Vella, 1961. *Typhis (Typhis)*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46, 47, 6 text figs. (p. 382, pl. 47, fig. 26)
Lower Miocene: Clifden, New Zealand
Typhis [EV]

colemani [as *lowei colemani*] Ponder, 1972. *Pterotyphis (Tripterotyphis)*
Ponder, Winston F. 1972. Notes on some Australian genera and species of the family Muricidae (Neogastropoda). Jour. Malac. Soc. Aust. 2(3):215-248, pls. 20-23 (pp. 220-221, pl. 20, fig. 4)
Recent: Tryon Island, S. Queensland, Australia
Tripterotyphis

**coronarius* Deshayes, 1865. *Typhis*
Deshayes, Gerard Paul. 1865. Description des animaux san vertèbres découverts dans le Bassin de Paris... Paris. Vol. 3 + Atlas, pp. 201-656 (p. 335, pl. 88, figs. 11-13)
Lower Eocene: France
Laevityphis (Type)

coronatus Broderip, 1833. *Typhis*
Broderip, W.J. 1833. [*in* Broderip, W.J., and G.B. Sowerby] Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London (1832):173-179 (p. 178). [Figured: Sowerby (1841) Conch. Illus. pl. 200, figs. 3,4]
Recent: "Colombiam Occidentalem (Salango" near Santa Elena Bay, Ecuador
Typhisopsis (Type)

**costaricensis* [as *linguliferus* Dall, var. *costaricensis*] Olsson, 1922. *Typhis*
Olsson, Axel A. 1922. The Miocene of northern Costa Rica. Pt. 1. Bull. Amer. Paleo. 9(39):173-339, pls. 1-32 (p. 304, pl. 10, figs. 22, 29)
Reprint ed. pp. 1-167, pls. 1-32 (p. 132, pl. 10, figs. 22, 29)
Middle Pliocene, Costa Rica
Laevityphis [G]

**costaricensis* Olsson, 1942. *Typhis (Talityphis)* [not *costaricensis* Olsson, 1922]
Olsson, Axel A. 1942. Tertiary and Quaternary fossils from the Burica Peninsula of Panama and Costa Rica. Bull. Amer. Paleo. 27(106:153-259, pls. 14-25 (p. 228, pl. 25, figs. 5,8)
Pleistocene: Costa Rica
Talityphis

cumingii Broderip, 1833. *Typhis*
Broderip, W.J. 1833. [*in* Broderip, W.J., and G.B. Sowerby] Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London (1832):173-179 (p. 177) [Figured: Sowerby (1841) Conch. Illus. pl. 200, figs. 1,2]
Recent: "ad Caraccas" Bahía de Caraques, Manta Bay, Ecuador
Haustellotyphis (Type)

**cuniculosa cuniculosus* Duchastel *in* Nyst, 1836. *Murex*
Duchastel *in* Nyst, 1836. Mess. Sci. Artes, Belg. 4:139-178 (p. 176, pl. 3, fig. 92) [not seen].
Oligocene: Belgium
Lyrotyphis (Type)

**curvirostratus* Conrad, 1847. *Typhis*
Conrad, Timothy A. 1847. Observations on the Eocene formation and description of one hundred and five new fossils of that period from the vicinity of Vicksburg, Mississippi. Proc. ANSP 3(11):280-299 (p. 285) [Figured: Conrad (1848) Jour. ANSP (2):116, pl. 11, fig. 29]
Oligocene: Mississippi
Laevityphis [G, EV]

**darienensis* Gertman, 1969. *Siphonochelus (Pilsbrytyphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 179, 180, pl. 7, figs. 5a, 5b)
Pliocene: Panama
Pilsbrytyphis [G, EV]

**dentatus* Johnson, 1899. *Typhis*
Johnson, Charles W. 1899. New and interesting species in the "Isaac Lea collection of Eocene Mollusca." Proc. ANSP 51:71-82, pls. 1,2 (p. 77, pl. 1, fig. 13)
Upper Eocene: Mississippi
Rugotyphis [V, EV]

**disjunctus* Tate, 1888. *Typhis*
Tate, Ralph. 1888. The gastropods of the older Tertiary of Australia. Trans. & Proc. Roy. Soc. S. Aust. 10:91-176, pls. 1-13 (p. 92, pl. 1, fig. 1)
Middle Miocene: Victoria, Australia
Typhina [V,EV]

duplicatus Sowerby, 1870. *Typhis*
Sowerby, George B., Jr. 1870. Descriptions of forty-eight new species of shells. Proc. Zool. Soc. London (1870):249-259, pls. 21, 22 (p. 251, pl. 21, figs. 1a, 1b)
Recent: China Seas
Siphonochelus [K]

**eocenicus* Schauroth, 1865. *Tiphys* [sic]
Schauroth, Carl F. von. 1865. Verzeichniss der Versteinerungen im Herzogl. Naturalien cabinet zu Coburg (no. 1-4328) pp. xv +327, 30 pls. (p. 234, pl. 23, fig. 8)
Eocene, Germany
Generic determination unclear

eos Hutton, 1873. *Murex*
Hutton, F.W. 1873. Catalogue of the Tertiary Mollusca of New Zealand... Wellington. 8°:xvi + 48 (p. 8) [Figured: Finlay (1927) Trans. New Zealand Inst. 57, pl. 19, fig. 55]
Recent: Bay of Islands, New Zealand
Prototyphis

erythrostigma Keen and Campbell, 1964. *Siphonochelus (Siphonochelus)*
Keen A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 51, 52, pl. 10, figs. 27, 31, 35)
Recent: Moreton Bay, Queensland, Australia
Trubatsa [RD]

**eucteanus* Woodring, 1970 *Typhis (Talityphis)*
Woodring, Wendell P. 1970. Geology and Paleontology of Canal Zone and adjoining parts of Panama. Descriptions of Tertiary mollusks (gastropods: Eulimidae, Marginellidae to Helminthoglyptidae). Geol. Surv. Prof. Paper 306-D, pp. 299-452, pls 48-66 (p. 434, pl. 63, figs. 9,10)
Middle Pliocene: Panama
Talityphis [EV]

**evaricosus* Tate, 1888. *Typhis*
Tate, Ralph. 1888. The gastropods of the older Tertiary of Australia. Trans. & Proc. Roy. Soc. S. Aust. 10:91-176, pls. 1-13, (p. 94, pl. 1, fig. 6)
Middle Miocene: Victoria, Australia
Siphonochelus [V, EV]

expansus Sowerby, 1874. *Typhis*
Sowerby, George, B., Jr. 1874. Descriptions of twelve new species of shells. Proc. Zool. Soc. London (1873): 718-722, pl. 59 (p. 719, pl. 59, fig. 4)
Recent: "Hab.__?" [Caribbean *fide* Keen (1944)]
Talityphis (Type)

fayae Keen and Campbell, 1964. *Pterotyphis (Tripterotyphis)*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 54, 55, pl. 11, figs. 39, 40, 43, 44, text figs. 1, 2)
Recent: Jalisco, Mexico
Tripterotyphis [KC, RD]

fimbriatus A. Adams, 1854. *Typhis*
Adams, Arthur. 1854. Descriptions of new shells from the collection of Hugh Cuming, Esq. Proc. Zool. Soc. London (1853): 69-74 (p. 70) [Figured: Sowerby (1874) Conch. Icon. 19 (*Typhis*) pl. 1, fig. 3]
Recent: "Hab. __?" [West Mexico]
Pterotyphis [Type of *Trigonotyphis*] [RD]

**fistulatus* Schlotheim, 1820. *Muricites*
Schlotheim, E.F. von. 1820. Die Petrefaektenk. Gotha (p. 139) [not seen]
Listed as *Murex (Typhis) fistulatus* (Schlotheim, 1820) in E. Beyrich, 1848. Arch., f. Min. XXII [*fide* Sherborn]
Oligocene: Germany
Lyrotyphis [EV]

fistulatus Risso, 1826. *Murex*
Risso, A. 1826. Histoire naturelle...del'Europe Meridionale... 5 vols. Paris. Vol. 4:i-vi + 439 pp., 12 pls. (p. 191)
Recent: Mediterranean
Typhis [EV]

**fistulosus* Brocchi, 1814. *Murex*
Brocchi, Giovanni B. Conchiologia fossile subapennina con osservatione geologiche sugli appennini e sul suolo adiacente. 2:241-677, pls. 1-16 (p. 394, pl. 7, figs. 12a-c)
Pliocene: Italy
Siphonochelus [K, EV]

**floridanus* Dall, 1889. *Typhis*
Dall, William H. 1889. Report on the Mollusca: Gastropoda and Scaphopoda. "Blake Report," Bull. Mus. Comp. Zool. 18(2):1-492, pls. 10-40 (p. 216) [Figured: Dall (1890) Trans. Wagner Free Inst. Sci. 3(1):152, pl. 9, fig. 5]
Pliocene: Florida
Rugotyphis [G, EV]

fordi Pilsbry, 1943. *Typhis*
Pilsbry, Henry A. 1943. A new Bahaman muricid mollusk. Nautilus 57(2):40, pl. 7, fig. 4
Recent: Bahamas
Pterotyphis [EV]

**francescae* Finlay, 1924. *Typhis*
Finlay, H.J. 1924. New shells from New Zealand Tertiary beds. Trans New Zealand Inst. 55:450-479, pls. 48-51 (p. 465, pl. 49, figs. 6a, 6b)
Lower Miocene: Clifden, New Zealand
Rugotyphis (Type)

frondosus ["*Typhis frondosus* J. Sowerby"] Broderip, 1833
Broderip, W.J. 1833. [*in* Broderip, W.J., and G.B. Sowerby] Proc. Zool. Soc. London (1832): 173-179 (p. 178), not a typhid, error for *Murex frondosus* Lamarck, 1803

fruticosus Gould, 1851. (*fide* Ruhoff, 1980). *Murex (Trophon)*
Gould, Augustus A. 1851. Proc. Boston Soc. Nat. Hist. 3:136-145 (p. 143). [Redescribed 1862 in Otia Conch., p. 66 and transferred to *Murex (Trophon)* [*Typhis*] in Rectifications, p. 245 (not typhid)]

fulva [as *sowerbyi fulva*] Pallary, 1906. *Typhis*
Pallary, Paul. 1906. Addition a la fauna malacologique du Golfe de Gabès. Jour. Conchyl. 54(2):77-124 (p. 90)
Recent: Sfax, Tunisia
Typhinellus [K]

**gaasensis* Tournouër *in* Benoit, 1880. *Typhis*
Tournouër, R. 1880. Étude sur les espèces de la sous-famille de Muricinae. Actes Soc. Linn. Bordeaux, vol. 34:145-173, pl. 9 (p. 149) [Figured: Cossmann (1903) Ess. Paleoconch. Comp. 5:61, pl. 3 fig. 3]
Oligocene: France
Typhis [EV]

**gabbi* Brown and Pilsbry, 1911. *Typhis*
Brown, Amos P., and Henry A. Pilsbry. 1911. Fauna of the Gatun Formation, Isthmus of Panama. Proc. ANSP 63:336-373, pls. 22-29 (pp. 354-355, pl. 26, fig. 6)
Middle Pliocene: Panama Canal Zone
Pilsbrytyphis (Type)

generosus Iredale, 1936. *Cyphonochelus* [sic]
Iredale, Tom. 1936. Australian molluscan notes, no. 2. Rec. Aust. Mus. 19(5): 267-340, pls. 20-24 (p. 325, pl. 24, fig. 13)
Recent: New South Wales, Australia
Siphonochelus [V]

**gracilis* Conrad, 1833. *Typhis*
Conrad, Timothy A. 1833. On some new fossils and Recent shells of the United States. Amer. Jour. Sci. 23(2):339-346 (p. 344) [Figured: Palmer (1937) Bull. Amer. Paleo. 7:271, pl. 36, fig. 1, 5; pl. 85, fig. 12]
Middle Eocene: Alabama
Laevityphis [G, EV]

grandis A. Adams, 1855. *Typhis*
Adams, Arthur. 1855. Description of a new genus and of several new species of gasteropodous Mollusca, from the Cumingian collection. Proc. Zool. Soc. London (1854):41-42, pl. 27 (p. 42, pl. 27, fig. 4)
Recent: Gulf of California
Typhisala (Type)

**harrisi* Olsson, 1914. *Typhis*
Olsson, Axel A. 1914. New and interesting Neocene fossils from the Atlantic Coastal Plain. Bull. Amer. Paleo 5(24):43-72, pls. 8-12 (p. 46, pl. 9, figs. 7,9)
Middle Pliocene: Florida
Rugotyphis [G,EV]

**hebetatus* Hutton, 1877. *Typhis*
Hutton, Frederick W. 1877. Descriptions of some new Tertiary mollusks from Canterbury. Trans. & Proc. New Zealand Inst. (for 1876)9:593-598, pl. 16 (p. 594, pl. 16, fig. 1)
Miocene: New Zealand
Hirtotyphis

**horridus* Brocchi, 1814. *Murex*
Brocchi, Giovanni Battista. 1814. Conchologia fossile subapennina con osservazioni geologiche sugli apennini e sul suolo adiacente. Milan. vol. 2:241-677, pls. 1-16 (p. 405, pl. 7, fig. 17)
Pliocene: Italy
Hirtotyphis (Type)

**hortensis* Oppenheim, 1900. *Typhis*
Oppenheim, Paul. 1900. Die Priabonaschichten und ihre fauna. Paläontographica 47, 348 pp., 21 pls. (p. 221, pl. 15, figs. 7-8b) [not seen]
Upper Eocene: Italy
Siphonochelus [K, EV]

imperialis Keen and Campbell, 1964. *Typhis (Typhina)*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 46-47, pl. 8, figs. 1-4)
Recent: Tosa, Japan
Typhina [KC, RD]

**incisus* Martin, 1931. *Semityphis*
Martin, Karl. 1931. Mollusken aus dem obereocän von Nanggulan. Dienst van der Mijnbouw in Neder.-Indië, Wetens. Meded. 18:1-56, pls. 1-7 (p. 31, pl.5, figs. 1, 1a)
Upper Eocene: Java
Semityphis (Type)

**intergymnus* Cossmann, 1919. *Typhis (Cyphonochilus)* [sic]
Cossmann, Alexandre E. 1919. Monographie illustrée des mollusques oligocéniques des environs de Rennes. Jour. Conchyl. 64(3):133-199, pls. 4-7 (p. 166, pl. 6, figs. 11, 12)
Oligocene: France
Siphonochelus [K, EV]

**intermedius* Bellardi, 1873. *Typhis*
Bellardi, Luigi. 1873. I molluschi dei terreni terziarii del Piemonte e delle Liguria. Mem. Roy. Acad. Sci. Torino (ser. 2) 27:33-324, pls. 1-15 (p. 40, pl. 4, fig. 1)
Miocene: Italy
Typhis [K, EV]

interpres [as *philippensis interpres*] Iredale, 1924. *Typhis*
Iredale, Tom. 1924. Results from Roy Bell's molluscan collections. Proc. Linn. Soc. N.S.W. 49(3):179-278, pls. 33-36 (pp. 183, 271, pl. 34, fig. 10)
Recent: New South Wales, Australia
Typhina

iredalei [as *zelandicus iredalei*] Fleming, 1962. *Pterynotus (Pterochelus)*
Fleming, Charles A. 1962. The genus *Pterynotus* Swainson (Gastropoda, family Muricidae) in New Zealand and Norfolk Island. Trans. Roy. Soc. New Zealand 2 (14):109-119, pl. 1 (p. 116, pl. 1, fig. 17)
Recent: Norfolk Island
Prototyphis

jamrachi von Martens, 1861. *Murex*
Martens, Eduard von. 1861. Malakologische Mittheilungen. Malak. Blätter 7(5): 225-228 (p. 225)
Recent: no type locality given [?Panama (*fide* E.H. Vokes)]
Pterotyphis

japonicus A. Adams, 1863. *Typhis*
Adams, Arthur. 1863. On the species of Muricinae found in Japan. Proc. Zool. Soc. London (1862):370-376 (p. 374) [Figured: Keen and Campbell (1964) Veliger 7(1), pl. 10, figs. 28, 32]
Recent: Uraga, Japan [Sagami Bay]
Siphonochelus [RD]

jardinreinensis Espinosa, 1985. *Typhis (Typhina)*
Espinosa, José. 1985. La subfamilia Typhinae (Mollusca: Gastropoda) en Cuba. Descripción de una nueva especie del género *Typhis*. Poeyana. Inst. Zool. Acad. Sci. Cuba, 300:1-13, 4 figs. (p. 2, fig. 1)
Recent: Camaguey, Cuba
Typhina

**keenae* Gertman, 1969. *Typhis (Rugotyphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4): 143-191, pls. 1-8 (p. 151, pl. 2, figs. 2a, 2b, 2c, 3a, 3b)
Late Lower Miocene: Florida
Rugotyphis [G, EV]

**labiatus* Cristofori and Jan, 1832. *Murex*
Cristofori, Josephi, and Georgii Jan. 1832. Cat. Mus. Sect. 2 Conch. Foss., 16 pp. (p. 11)
Pliocene: Italy
Typhinellus [EV]

**laciniatus* Tate, 1888. *Typhis*
Tate, Ralph. 1888. The gastropods of the older Tertiary of Australia. Trans. & Proc. Roy. Soc. S. Aust. 10:91-176, pls. 1-13 (p. 93, pl. 1, fig. 10)
Middle Miocene: Victoria, Australia
Typhinellus

**lampada* Keen, 1943. *Typhis (Talityphis)*
Keen, A. Myra. 1943. New mollusks from Round Mountain silt (Temblor) Miocene of California. Trans. San Diego Soc. Nat. Hist. 10(2):25-60, pls. 3-4, figs. 1-5 (p. 53, pl. 3, figs. 14, 19, 23)
Miocene: Kern County, California
Talityphis [K, EV]

latipennis Dall, 1919. *Typhis*
Dall, William H. 1919. Descriptions of new species of Mollusca from the North Pacific Ocean in the collection of the United States National Museum. Proc. USNM 56(2295):293-371 (p. 339). [Figured: Keen (1943) SDSNH 10(2) pl. 3, figs. 17, 21, 24]
Recent: Baja California, Mexico
Talityphis [RD]

**linguiferus* Dall, 1890. *Typhis*
Dall, William H. 1890. Contributions to the Tertiary fauna of Florida. Trans. Wagner Free Inst. Sci. 3(1):1-200, 12 pls. (p. 152-153, pl. 12, fig. 7)
Late Lower Miocene: Florida
Laevityphis [G, EV]

linguliferus [sic] Dall, 1890. [misspelling in Olsson (1922) as *linguliferus costaricensis*]

longicornis Dall, 1888. *Typhis*
Dall, William H. 1888. [*in* Agassiz]. Three cruises of the Blake. Bull. Mus. Comp. Zool. 15(2):58-75, figs. 282-312 (p. 70, fig. 294); as *Typhis Trubatsa* Dall, 1889. Blake Report, Bull. Mus. Comp. Zool. 18:216, pl. 15, fig. 7 and pl. 38, fig. 5
Recent: off Havana, Cuba
Trubatsa (Type)

lowei Pilsbry, 1931. *Typhis*
Pilsbry, Henry A. 1931. *Typhis lowei* n. sp. Nautilus 45(2):72. [Figured: Pilsbry & Lowe (1932) Proc. ANSP 84:77, pl. 4, figs. 11, 11a]
Recent: Montijo Bay at Mariato, Panama
Tripterotyphis (Type)

**ludbrookae* Keen and Campbell, 1964. *Laevityphis (Laevityphis)*
[New name for *Typhis tripterus* Tate, 1888. For discussion see Keen & Campbell, 1964]
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 52, 53, pl. 10, figs. 33, 34, 36)
Upper Eocene: Australia
Laevityphis [KC, EV]

**maccoyi* Tenison-Woods, 1876. *Typhis* [*M'Coyi* in original spelling]
Tenison-Woods, J.E. 1876. On some Tertiary fossils from Table Cape. Pap. & Proc. Roy. Soc. Tasmania for 1875:13-26, pls. 1-3 (p. 22, pl. 1, fig. 5)
Late Oligocene-Early Miocene: Table Cape, Tasmania
Typhinellus [K, EV]

**macropterus* Martin, 1883. *Typhis*
Martin, Karl. 1883. Palaeontologische Ergebnisse von Tiefbohrungen auf Java, nebst allgemeineren Studien uber das Tertiär von Java. Timor und einiger anderer Inseln. Geol. Reichmus. Leiden Samml. (ser. 1) 3:1-380, 15 pls. (p. 98, pl. 6, fig. 100) [not seen]
Miocene: Java
Typhinellus [K]

**magnei* Vergnau-Saubade, 1968. *Pterotyphis*
Vergnau-Saubade, A.M. 1968. Quelques espèces nouvelles de mollusques l'Oligocene Aquitain. Bull. Inst. Geol. Bassin Aquitaine 4:196-211, 23 figs. (p. 203) [not seen]
Oligocene: France
Pterotyphis [EV]

martyria Dall, 1902. *Typhis*
Dall, William H. 1902. Illustrations and descriptions of new unfigured, or imperfectly known shells, chiefly American, in the U.S. National Museum. Proc. USNM 24(1264):499-566, pls. 27-40 (p. 550) [Figured: Dall (1908) Bull. Mus. Comp. Zool. 43(6), pl. 15, fig. 1]
Recent: San Pedro Martir Is., Gulf of California
Typhisala [K]

melloleitaoi Morretes, 1940. *Typhis*
Morretes, F. Lange de. 1940. Novos moluscos marinhos do Brazil. Museu Paulista Rev. 25, Arquivos de Zoologia do Estado São Paulo 2(7):251-256, 1 pl. (p. 251, pl. 1, figs. 1-3)
Recent: Brazil
Typhina

minor [as *sowerbyi minor*] Pallary, 1906. *Typhis*
Pallary, Paul. 1906. Addition a la fauna malacologique du Golfe de Gabès. Jour. Conchyl. 54(2):77-124 (p. 90)
Recent: Sfax, Tunisia
Typhinellus

**mississippiensis* Gertman, 1969. *Typhis (Typhina)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 149, pl. 1, figs. 2a, 2b)
Lower Oligocene: Mississippi
Typhina [G, EV]

montfortii A. Adams, 1863. *Typhis*
Adams, Arthur. 1863. On species of Muricinae found in Japan. Proc. Zool. Soc. London (1862):370-376 (p. 374) [Figured: Sowerby (1866) Thes. Conchyl. (*Typhis*) 3(24-25):320, pl. 284, figs. 18, 19]
Recent: Okino-Sima, Japan
Typhina [V, RD]

**muticus* Sowerby, 1834. *Typhis*
Sowerby, James de Carle. 1834. The Mineral Conchology of Great Britain, vol. 6, pl. 247 (index) [Figured: Sowerby (1818) as *Murex tubifer* in same publication 2(2):201-202, pl. 189, fig. 6]
Lower Eocene: England
Typhis [EV]

myrae DuShane, 1969. *Cinclidotyphis*
DuShane, Helen. 1969. A new genus and two new species of Typhinae from the Panamic Province (Gastropoda: Muricidae). Veliger 11(4):343-345, pl. 54 (p. 343, pl. 54, figs. 1-3)
Recent: Tenacatita Bay, Jalisco, Mexico
Cinclidotyphis (Type)

neocaledonicus Houart, 1987. *Typhis (Talityphis)*
Houart, Roland. 1987. Description of four new species of Muricidae (Mollusca: Gastropoda) from New Caledonia. Venus 46(4):202-210, 16 figs. (pp. 208-209, figs. 8. 9. 16)
Recent: Grand Récif Sud, New Caledonia
Talityphis

**nigeriensis.* Arua, 1981. *Siphonochelus*
Arua, Ingela. 1981. First record of typhine gasteropods from the Eocene of southeastern Nigeria. Geologie en Mijnbouw 60(2):277-280, figs. 1-4 (pp. 279-280, figs. 2-4)
Eocene: Nigeria
Siphonochelus

nipponensis Keen and Campbell, 1964. *Siphonochelus (Siphonochelus)*
Keen A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 50-51, pl. 10, figs. 25, 29)
Recent: Tosa, Japan
Siphonochelus [KC, RD]

nitens Hinds, 1843. *Typhis*
Hinds, Richard. 1843. On new species of shells collected by Sir Edward Belcher. Proc. Zool. Soc. London (1843):17-19 (p. 19) [Figured: Hinds (1844) Voyage of HMS Sulphur p. 10, pl. 3, figs. 5,6]
Recent: Straits of Macassar, Indian Archipelago
Typhina [V, RD]

norfolkensis Fleming, 1962. *Pterynotus (Nothotyphis)*
Fleming, Charles A. 1962. The genus *Pterynotus* Swainson (Gastropoda, family Muricidae) in New Zealand and Norfolk Island. Trans. Roy. Soc. New Zealand 2(14):109-119, 1 pl. (pp. 117, 118, pl. 1, figs. 18, 19)
Recent: Norfolk Island
Nothotyphis (Type) [= *Tripterotyphis*]
Tripterotyphis [RD]

**nystii* Orbigny, 1852. *Tiphis* [sic]
Orbigny, Alcide d'. 1852. Prodrome de paléontologie stratigraphique universelles, des animaux, mollusques et rayonnés...3 vols. Paris. (3:15) [Figured: Nyst (1843) as new name for *Murex tubifer* Bruguière of Nyst (not of Bruguière). Description de Coquilles et des polypiers fossiles de terrains tertiaires de la Belgique, p. 549, pl. 43, figs. 3a, 3b] [not seen]
Oligocene: Belgium
Typhis [EV]

**obesus* Gabb, 1873. *Typhis*
Gabb, William. 1873. Notes on the topography and geology of Santo Domingo. Trans. Amer. Philos. Soc. (n. ser.) 15:49-259 (p. 203) [Figured: Pilsbry: (1922) Proc. Acad. Nat. Sci. Phila. 73:354, pl. 28, figs. 5,6]
Lower Miocene: Dominican Republic
Talityphis [G, EV]

occlusum Garrard, 1963. *Typhisopsis*
Garrard, Tom A. 1963. New species of Mollusca from eastern Australia. Jour. Malac. Soc. Aust. 1(7):42-46, pl. 7 (p. 46, pl. 7, figs. 9, 10)
Recent: Whitsunday Passage, Queensland, Australia
Typhisala

**olssoni* Keen, 1943. *Typhis (Talityphis)*
[New name for *T. (T.) costaricensis* Olsson, 1942, not Olsson, 1922]
Keen. A. Myra. 1943. New Mollusks from the Round Mountain silt (Temblor) Miocene of California. Trans. San Diego Soc. Nat. Hist. 10(2):25-60, pls. 3,4 (p. 54, footnote 11 & p. 27, abstract)
Pleistocene: Burica Peninsula, Costa Rica
Talityphis [EV]

**osawanoensis* Tsuda, 1959. *Typhis (Typhis)*
Tsuda, K. 1959. New Miocene molluscs from the Kurosedani Formation. Jour. Faculty Sci. Niigata Univ. (ser. 2) 3:67-110, 7 pls., 1 map (p. 88, figured) [not seen]
Miocene: Kurosedani Formation, Japan
Typhis [EV]

**palmerae* Gertman, 1969. *Typhis (Typhina)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 148, pl. 1, figs. 1a, 1b)
Middle Eocene: Texas
Typhina [G, EV]

**panoplus* Maxwell, 1971. *Typhis (Hirtotyphis)*
Maxwell, Phillip A. 1971. Notes on some Cenozoic Muricidae (Mollusca: Gastropoda) from New Zealand with a review of the genus *Poirieria* Jousseaume, 1880. New Zealand Jour. Geol. & Geophys. 14(4):757-781, 32 figs. (p. 778, figs. 3, 15, 16)
Upper Oligocene: South Canterbury, New Zealand
Hirtotyphis [EV]

**parisiensis* Orbigny, 1850. *Tiphis* [sic]
Orbigny, Alcide d'. 1850. Prodrome de paleontologie stratigraphique universelles des animaux, mollusques et rayonnes...3 vols. Paris. (2:364) [not seen]
Eocene: Europe
Typhis [EV]

**patellifer* Martin, 1931. *Typhis (Typhinellus)*
Martin, Karl. 1931. Mollusken aus dem obereocan von Nanggulan. Dienst van der Mijnbouw in Neder.-Indië, Wetens. Meded. 18:1-56, pls. 1-7 (p. 31, pl. 4, figs. 16, 16a)
Eocene: Netherlands East Indies
Typhina

pauperequs Powell, 1974. *Pterochelus*
Powell, A.W.P. 1974. New Zealand molluscan systematics with descriptions of new species. Pt. 8. Rec. Auck. Inst. Mus. 11:197-207, figs. 9-12 (p. 199, figs. 10,11)
Recent: Poor Knights Island, New Zealand
Prototyphis

pauperis Mestayer, 1916. *Typhis*
Mestayer, M.K. 1916. Preliminary list of Mollusca from dredgings taken off the northern coasts of New Zealand. Trans. & Proc. New Zealand Inst. 48:122-128, pl. 12 (p. 127, pl. 12, figs. 9, 9a)
Recent: Poor Knights Island, New Zealand
Typhina [V, RD]

pavlova Iredale, 1936 *Typhis (Typhina)*
Iredale, Tom. 1936. Australian molluscan notes, no. 2. Rec. Aust. Mus. 19(5): 267-340, pls. 20-24 (p. 324, pl. 24, fig. 12)
Recent: New South Wales, Australia
Trubatsa (Type of *Choreotyphis)*

pentaphasios Barnard, 1959. *Typhis*
Barnard, K.H. 1959. Contributions to the knowledge of South African marine Mollusca, Part 2, Gastropoda, Prosobranchia, Rachiglossa. Ann. S. Afr. Mus. 45(1):1-237, 52 figs. (p. 211, text figs. 46h, 46i)
Recent: Cape Point, South Africa
Siphonochelus [RD]

perchardei Radwin and D'Attilio, 1976. *Talityphis*
Radwin, George E. and Anthony D'Attilio. 1976. Murex Shells of the World, an illustrated guide to the Muricidae. Stanford Univ. Press. 284 pp., 32 pls., 192 text figs. [appendix pp. 219-238] (pp. 236-238, pl. 30, fig. 15, text figs. 190-192)
Recent: Bocas, Trinidad, West Indies
Talityphis [RD]

**peyreirensis* Cossmann and Peyrot, 1924. *Typhis*
Cossmann, Alexandre E.M., and A. Peyrot. 1924. Conchologie néogenique de l'Aquitaine (Suite). Actes Soc. Linn. Bordeaux 75:193-318, pls. 14-18 (p. 235, pl. 16, figs. 34, 35)
Oligocene: France
Typhis [KC EV]

philippensis Watson, 1883. *Typhis*
Watson, Robert B. 1883. Mollusca of HMS Challenger Expedition, pt. XV, Jour. Linn. Soc. London 16:594-611 (p. 605). [Figured: Watson (1886) Report on the Scaphopoda and Gastropoda collected by H.M.S. Challenger... pt. V, vol. 15(42) p. 162, pl. 10, fig. 4]
Recent: Port Phillip, Melbourne, Australia
Typhina [RD, EV]

pinnatus Broderip, 1833. *Typhis*
Broderip, W.J. 1833. [*in* Broderip, W.J. & G.B. Sowerby) Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London (1832): 173-179 (p. 178) [Figured: Sowerby (1841) Conch. Illus. pt. 200, figs. 10, 11]
Recent: locality not given in original description [Caribbean]
Pterotyphis (Type)

**planus* Vella, 1961. *Typhis (Typhis)*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46, 47, 6 text figs. (pp. 381-382, pl. 46, fig. 7)
Lower Miocene: New Zealand
Typhis [V, EV]

**powelli* [as *angasi powelli*] Fleming, 1962. *Pterynotus (Pterochelus)*
Fleming, Charles A. 1962. The genus *Pterynotus* Swainson (Gastropoda, family Muricidae in New Zealand and Norfolk Island. Trans. Roy. Soc. New Zealand (Zool.)2:109-119, 1 pl. (p. 114, pl. 1, figs. 11, 12)
Early Pleistocene: Castlecliff, Wanganui, Okehuan, New Zealand
Prototyphis

**precursor* Keen and Campbell, 1964. *Typhis (Talityphis)*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 49-50, pl. 9, figs. 14, 18, 21, 22)
Lower Miocene: Puerto Colombia, Colombia
Talityphis [G, KC, EV]

**prisca* [as *fistulosus* var. *prisca*] Rutot, 1876. *Typhis*
Rutot, A. 1876. Description de la faune de l'oligocène inférieure de Belgique... Ann. Soc. Malac. Belgique 11:7-67, pls. 1-4 (p. 66, pl. 4, figs. 5a, 5b)
Lower Oligocene: Belgium
Siphonochelus [K, EV]

**protetraptera* [as *tetrapterus* var. *protetraptera*] Sacco, 1890. *Typhis (Typhinellus)*
Sacco. F. 1890. Catalogico del bacino Terziario del Piemonte. Boll. Soc. Geol. Italiana 9:185-340 (p. 239, for var. A. Bellardi, 1872) [Figured: Sacco (1904) I Molluschi dei terreni Terziarii del Piemonte e della Liguria, pt. 30, p. 17, pl. 4, fig. 20]
Oligocene: Italy
Typhinellus [V, EV]

**pseudo-fistulosis* Edwards, 1866. *Typhis*
Edwards, Frederic. 1866.[*in* J.W. Lowry] Figures of the characteristic British Tertiary fossils...4 pls. (pl. 3) [not seen]
Eocene: England
Typhis [EV]

**pterinus* Gardner, 1936. *Typhis*
Gardner, Julia. 1936. Additions to the molluscan fauna of the Alum Bluff group of Florida. Fla. Geol. Surv. Bull. 14, 82 pp., 10 pls. (p. 52, pl. 10, fig. 10)
Middle Miocene: Florida
Talityphis [G, EV]

puertoricensis Warmke, 1964. *Typhis*
Warmke, Germaine L. 1964. A new Caribbean muricid mollusk, *Typhis puertoricensis*. Nautilus 78(1):1-3, pl. 1 (pp. 1-3, pl. 1, figs. 1-4)
Recent: off Punta Cadena, Puerto Rico
Rugotyphis [G]

**pungens* Solander *in* Brander, 1766. *Murex*
Solander, Daniel C. [*In* G. Brander]. 1766. Fossilia Hantoniensia collecta, et in Musaeo Britannico deposita...pp. vi + 43, 9 pls. (p. 35, pl. 3, fig. 81), London
Upper Eocene: England
Hirtotyphis

quadratus Hinds, 1843. *Typhis*
Hinds, Richard B. 1843. On new species of shells collected by Sir Edward Belcher: Proc. Zool. Soc. London (1843):17-19 (pp. 18-19) [Figured: Hinds (1844) Voyage of HMS Sulphur p. 10, pl. 3, figs. 3,4]
Recent: Gulf of Nicoya and Bay of Guayaquil
Typhisopsis

radwini Emerson and D'Attilio, 1979. *Siphonochelus*
Emerson, William K., and Anthony D'Attilio. 1979. Six new living species of muricacean gastropods. Nautilus 93(1):1-10, 21 figs. (pp. 8-9, figs. 20, 21)
Recent: Cabo Catoche, Yucatan, Mexico
Siphonochelus

ramosus Habe and Kosuge, 1970. *Typhis*
Habe, Tadashige, and Sadao Kosuge. 1970. Pacific Shell News, Number 3:7-11, 4 pls. (p. 8, 2 figs) [Subsequently proposed as *Typhis ramosus* Habe and Kosuge, 1971, in Nautilus 84(3):82-83, figs. 1, 2. See Emerson and Sage (1987)]
Recent: South China Sea
Typhina [RD]

**rarus* Tembrock, 1963. *Typhis (Typhis)*
Tembrock, Maria Luise. 1963. Muriciden aus dem Mittle-und Oberoligozän und den Vierlandschicten des Nordseebeckens. Paläontologische Abhandlungen 1(4):299-351, pl. 1-10 (pp. 329-330, pl. 7, fig. 11; pl. 8, figs. 9, 18a, 18b, pl. 10, fig. 10)
Oligocene: Northeastern Germany
Typhis [EV]

recens [as *fistulosus recens*] Nordsieck, 1972. *Typhis (Cephonochelus)* [sic]
Nordsieck, Fritz. 1972. Marine gastropoden aus der Shiqmona-Bucht in Israel. Archiv. für Molluskenkunde 102(4/6):227-245 (p. 236, fig. 35)
Recent: Shiqmona, Israel
Siphonochelus

riosi Bertsch and D'Attilio, 1980. *Typhina*
Bertsch, Hans, and Anthony D'Attilio. 1980. New species of Muricidae (Gastropoda) from the Indian Ocean, the Philippines and Brazil. Venus 39(3):131-138, 7 figs. (pp. 135-137, figs. 5-7)
Recent: off Tramandai, Brazil
Typhina

robustus Verco, 1895. *Murex (Poropteron)*
Verco, Joseph C. 1895. Descriptions of new species of marine Mollusca of South Australia. Trans. Roy. Soc. S. Aust. 19:84-94, 3 pls. (p. 85, pl. 2, figs. 3, 3a)
Recent: South Australia
Tripterotyphis

**rugicostatus* Chapman and Crespin, 1933. *Typhis (Cyphonochelus)* [sic]
Chapman, Frederick, and Irene Crespin. 1933. New and rare Tertiary Mollusca from deep borings in Gippsland, Victoria. Proc. Roy. Soc. Victoria 46(1):66-76, pl. 5 (pp. 72-73, pl. 5, fig. 10)
Lower Pliocene: Victoria, Australia
Siphonochelus [V, EV]

**rutoti* Cossmann, 1882. *Typhis*
Cossmann, Alexandre E.M. 1882. Descriptions d'espèces nouvelles du Bassin Parisien. Jour. Conchyl. 30(2):114-130, pls. 5,6 (pp. 125, 126, pl. 6, fig. 7)
Middle Eocene: France
Typhis [K, EV]

**sawkinsi* Mansfield, 1925.
Mansfield, Wendell C. 1925. Miocene gastropods and scaphopods from Trinidad, British West Indies. Proc. USNM 66(Art. 22):1-65, pls. 1-10 (p. 48, pl. 2, fig. 11)
Miocene: Trinidad
Laevityphis [G, EV]

**schencki* Keen and Campbell, 1964. *Laevityphis (Laevityphis)*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (p. 53, pl. 9, figs. 16, 20)
Lower Miocene: Colombia
Laevityphis [G, KC, EV]

**schlotheimi* Beyrich, 1854. *Tiphys* [sic]
Beyrich, Ernest. 1854. Die conchylien des norddeutschen Tertiärgebirges, pt. 3. Geol. Gessell. Berlin Zeitschr. 6:726-781, pl. 12-15 (p. 765, pl. 14, figs. 7a-7c) [not seen]
Upper Oligocene: Germany
Lyrotyphis [K]

**secundus* Vella, 1961.
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46, 47, 6 text figs. (p. 386, pl. 46, figs. 8. 9)
Lower to Middle Miocene: Clifden, Southland, New Zealand
Rugotyphis [V, EV]

**sejunctus* Semper, 1861 *Tiphys* [sic]
Semper, Johannes O. 1861. Paläontologisches Unterschungen...Thl. 1, 241 pp. Neubrandenberg. [Reprinted from Archiv. Vereins Freunde Naturg. Mecklenburg 15: 221-428, 1861. (*fide* Brit. Mus. Cat.)] [not seen]. [Figured: Speyer (1863) Die Conchylien der Casseler Tertiär-Bildungen pt. 2. Paläontographica 9(5):182, pl. 33, figs. 9-11]
Upper Oligocene: northern Germany
Siphonochelus [Type of *Eotyphis*]

**simplex* Philippi, 1841. *Murex (Typhis)*
Philippi, Rudolph A. 1841. Uber die Tertiärversteinerungen der Wilhelmshöhe bei Kassel. 38 pp. (p. 26, pl. 4, fig. 22) [not seen]
Oligocene: Kassel, Germany
Lyrotyphis

**sinuousus* Cossmann, 1902. *Typhis*
Cossmann, Alexandre E.M. 1902. Mollusques éoceniques de la Loire-inférieure. Bull. Soc. Sci. Nat. Ouest (ser. 2) 2(1):5-157, pls. 1-12 (p. 133, pl. 11, figs. 25, 26) [not seen]
Eocene: Loire, France
Laevityphis [K]

**siphon* Woodring, 1928. *Typhis (Typhinellus)*
Woodring, Wendell P. 1928. Miocene mollusks from Bowden, Jamaica, Part 2. Gastropods and discussion of results. Carnegie Inst. Washington, Pub. 385, 564 pp., 40 pls. (p. 293, pl. 18, fig. 2)
Pleistocene: Jamaica
Talityphis [G, EV]

**siphonifera* Dall, 1915. *Typhis*
Dall, William H. 1915. A monograph of the molluscan fauna of the Orthaulax Pugnax zone of the Oligocene of Tampa, Florida. Bull. USNM 90:i-xv + 1-173, pls. 1-25 (pp. 77-78, pl. 13, fig. 9)
Lower Miocene: Florida
Typhina [G, EV]

siphoniferus Lesson, 1844. *Murex*
Lesson, R.P. 1844. Echo Monde Savant. 11:568 [not seen]
Recent: East Pacific
Generic determination unclear

solus Vella, 1961. *Siphonochelus*
Vella, Paul. 1961. Australasian Typhinae (Gastropoda) with notes on the subfamily. Palaeontology 4(3):362-391, pls. 46-77, 6 text figs. (p. 388, pl. 47, fig. 21)
Recent: New Zealand
Siphonochelus [V, RD]

sowerbii Broderip, 1833. *Typhis*
[emended to *sowerbyii* and/or *sowerbyi* by some subsequent authors. For discussion see Gertman (1969:156)]
Broderip, W.J. 1833. [*in* Broderip, W.J., and G.B. Sowerby] Characters of new species of Mollusca and Conchifera collected by Mr. Cuming. Proc. Zool. Soc. London (1832):173-179 (p. 178) [Figured: Sowerby (1841), Conch. Illus. pt. 200, figs. 7, 8]
Recent: Mediterranean (and Caribbean)
Typhinellus (Type)

**sterueri* Tembrock, 1963. *Typhis (Typhis)*
Tembrock, Maria Luise. 1963. Muriciden aus dem mittel-und Oberologozän und den Vierlandschichten des Nordseebeckens. Paläontologische Abhandlungen 1(4):299-351, pls. 1-10 (p. 331, pl. 7, fig. 13; pl. 8, fig. 10; pl. 9, fig. 12)
Upper Oligocene: East Germany
Typhis [EV]

**stewarti* E.H. Vokes, 1983. *Typhis (Rugotyphis)*
Vokes, Emily H. 1983. Additions to the Typhinae (Gastropoda: Muricidae) of the Gatun Formation, Panama. Tulane Stud. Geol. Paleont. 17(4):123-130, 1 pl. (pp. 126-128, figs. 8, 9)
Pliocene: Panama
Rugotyphis [EV]

stillicandidus Houart, 1985. *Siphonochelus*
Houart, Roland. 1985. Report on Muricidae (Gastropoda) recently dredged in the south-western Indian Ocean - 1. Venus 44(3):159-171, 8 figs. (pp. 168-170, figs. 8, 8a, 8b)
Recent: South Africa, Indian Ocean
Siphonochelus

subtubifer Orbigny, 1852. *Typhis*
Orbigny, Alcide d'. 1852. Prodrome de paléontologie stratigraphique universelles des animaux, mollusques et rayonnés...3 vols. Paris. (3:76) [not seen]
Upper Oligocene: France
Siphonochelus [K, EV]

suzukii Lopez, 1977. *(Typhis). nomen nudum*
Lopez, Al. 1977. Hawaiian Shell News 25(5):4, 1 fig.
Note: Sadao Kosuge (*in litt.*) stated that this name must have been "confused with *T. ramosus* Habe & Kosuge, 1971...described based on the material from Mr. Suzuki."

syphonellus Bonelli [*in* Bellardi and Michelotti,] 1841. *Murex*
Bonelli [*in* Bellardi, Luigi, and Giovanni Michelotti] 1841. Orittografico sulla classe dei gasteropodi fossili dei terreni terziarii del Piemonte. Mem. R. Accad. Sci. Torino, ser. 2, 3:93-174 (p. 129, pl. 3, figs. 3,4) [not seen]
Pliocene: Italy
Typhinellus [K, EV]

syringianus Hedley, 1903. *Typhis*
Hedley, Charles. 1903. Mollusca, Pt. 2. Scaphopoda and Gastropoda. Mem. Aust. Mus. 4(1):326-402, text figs. 61-113, pls. 36-38 (p. 381, text fig. 94)
Recent: New South Wales, Australia
Siphonochelus [RD]

**tepunga* Fleming, 1943. *Typhis*
[emended to *tepungai* at the request of Dr. C.A. Fleming. See Vella, 1961, p. 385]
Fleming, Charles A. 1943. Tertiary Mollusca from Dannevirke subdivision. Trans. Roy. Soc. New Zealand 73(3):193-208, pls. 28-31 (p. 205, pl. 30, fig. 21)
Pliocene: New Zealand
Neotyphis (Type)

**tepungai* Fleming, 1943. *Typhis*
See *tepunga* Fleming, 1943

teramachii Keen and Campbell, 1964. *Typhis (Typhina)*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (p. 48, pl. 8, figs. 9-11)
Recent: Kii, Japan
Typhina [KC]

**tetragoniatus* Cossmann, 1903. *Typhis (Typhinellus)*
Cossmann, Alexandre E.M. 1903. Faune pliocenique de Karikal (Inde francaise). Jour. Conchyl. 51(2):105-173, pls. 3-6 (pp. 154-155, pl. 6, fig. 7)
Pliocene: Karikal, India
Typhinellus [EV]

**tetrapterus* Bronn, 1838. *Murex*
Bronn, Heinrich G. 1838. Lethea geognostica, oder Abbildungen und beschreibung der für de Gabirgs-Formationen bezeichnendsten Versteinerungen. Stuttgart. 2(9) (p. 1077, pl. 41, fig. 13) [not seen]
Pliocene: Italy
Typhinellus [K, V, EV]

**thagus* Olsson, 1930. *Typhis (Levityphis)* [sic]
Olsson, Axel A. 1930. Contributions to the Tertiary paleontology of northern Peru: Pt. 3. Eocene Mollusca. Bull. Amer. Paleo. 17(62):1-96, pls. 1-12 (p. 58, pl. 12, fig. 6)
Eocene: Peru
Laevityphis [K, EV]

tillierae Houart, Roland. 1986. *Siphonochelus (Laevityphis)*
Houart, Roland. 1986. Mollusca Gastropoda: Noteworthy Muricidae from the Pacific Ocean, with description of seven new species. Mem. Mus. Nat. Hist. (ser. A) Zool. 133:427-455, 5 pls. (pp. 442-443, pl. 2, figs. 6, 6A)
Recent: New Caledonia
Siphonochelus

tityrus Bayer, 1971. *Typhis (Siphonochelus)*
Bayer, Frederick M. 1971. New and unusual mollusks collected by R/V John Elliott Pillsbury and R/V Gerda in the tropical western Atlantic. Bull. Mar. Sci. 21(1):111-237, 72 figs. (pp. 164-166, figs. 33, 34c)
Recent: off Isla Margarita, Venezuela
Trubatsa

tosaensis Azuma, 1960. *Typhis (Typhinellus)*
Azuma, Masao. 1960. A catalogue of the shell-bearing Mollusca of Okinoshima, Kashiwajima and the adjacent area (Tosa Province) Shikoku, Japan. Osaka. 102 pp. + 5 pls. (unpaginated) +17 page index + map + errata sheet + 4 page supplement (p. 34 (no. 596 only); p. 99, pl. 2, fig. 8)
Recent: Tosa Bay, Shikoku Island, Japan
Monstrotyphis (Type)

transcurrens von Martens, 1902. *Typhis*
Martens, Eduard von. 1902. Einige neue arten von Meer-Conchylien aus den sammlungen der Deutschen Tiefsee-Expedition. Gessell. naturf. Freunde Berlin Sitzungsber. 9:237-244 (p. 240). Figured: Martens (1904) Die beschalten Gastropoden der deutschen Tiefsee-Expedition 1898-1899. pt. A: Deutschen Tiefsee-Exped. Wiss. Ergebn. 7:94, pl. 3, fig. 2 [not seen]
Recent: Zanzibar Canal, East Africa (5°27'S; 39°18'E, 463-465 m)
Laevityphis [RD]

triangularis A. Adams, 1855. *Typhis*
Adams, Arthur. 1855. Descriptions of two new genera and several new species of Mollusca, from the collection of Hugh Cuming, Esq. Proc. Zool. Soc. London 23: 119-124 (p. 124)
Recent: Type locality not given in original description (Western Atlantic)
Tripterotyphis [G, RD]

**tripterus* Grateloup, 1833. *Typhis*
Grateloup, Jean P.S. de. 1833. Tableau des coquilles fossiles qu'on recontre dans les terrains calcaires tertiares (faluns) des environs de Dax dans le département des Landes. Pt. XV: Actes Soc. Linn. Bordeaux 6(34):159-164 (p. 160) [Figured as *Murex*: Grateloup (1847) Atlas Adour pl. 2 (no. 30), fig. 22]
Miocene: Landes, France
Pterotyphis [EV]

**tripterus* Tate, 1888. *Typhis* [not *Typhis tripterus* Grateloup, 1833]
Tate, Ralph. 1888. The gastropods of the older Tertiary of Australia. Trans. & Proc. Roy. Soc. S. Aust. 10:91-176, pls. 1-13 (p. 93, pl. 3, fig. 14)
Eocene: Australia
Laevityphis = L. ludbrookae Keen and Campbell, 1964 [EV]

**tubifer* Bruguière, 1792. *Purpura*
Bruguière, J.C. 1792. Description de deux coquilles, des genres de l'Oscabrion et de la Pourpre: Jour Hist. Nat. 1:20-30, pl. 2 (p. 29, pl. 2, figs. 3-4)
Eocene: France
Typhis (Type)

tubuliger Thiele, 1925. *Typhis*
Thiele, Johannes. 1925. Gastropoda der Deutschen Tiefsee-Expedition. II Teil: Wissenschaftliche Ergebnisse der Deutschen Tiefsee-Expedition auf dem Dampfer Valdivia 1898-1899, 17(2):38-382, pls. 13-46 (p. 171, pl. 13, fig. 18)
Recent: Off Formosa Bay, East Africa
Laevityphis [RD]

typhopsis de Gregorio, 1895. *Murex*
de Gregorio, A. 1895. Ann. Geol. Paleont. 20 (p. 10, pl. 1, fig. 15) [not seen]
Eocene: Italy
? *Typhis* [EV]

**vaquezi* Cossmann, 1906. *Typhis*
Cossmann, Alexandre E.M. 1906. Mollusques éoceniques de la Loire-inférieure Bull. Soc. Sci. Nat. Ouest ser. 2, 6(4):189-265, pls. 15-20 (p. 253, pl. 20, figs. 35, 37)
Middle Eocene
Laevityphis [K, EV]

**vellai* Maxwell, 1971. *Typhis (Rugotyphis)*
Maxwell, Phillip H. 1971. Notes on some Cenozoic Muricidae (Mollusca: Gastropoda) from New Zealand with a review of the genus *Poirieria* Jousseaume, 1880. New Zealand Jour. Geol. & Geophysics 14(4):757-781, 32 figs. (p. 779, figs. 6, 13)
Lower Miocene: New Zealand
Rugotyphis [EV]

vemae Keen and Campbell, 1964. *Distichotyphis*
Keen, A. Myra, and G. Bruce Campbell. 1964. Ten new species of Typhinae (Gastropoda: Muricidae). Veliger 7(1):46-57, pls. 8-11, 3 text figs. (pp. 56-57, pl. 11, figs. 45-47, text fig. 3)
Recent: off Panama and Costa Rica
Distichotyphis (Type)

virginiae Houart, 1986. *Typhis (Typhina)*
Houart, Roland. 1986. Mollusca Gastropoda: Noteworthy Muricidae from the Pacific Ocean with description of seven new species. Mem. Mus. Nat. Hist. Natur. Paris (ser. A) Zool. 133:427-455, 5 pls. (pp. 440-441, pl. 2, figs. 7-7B)
Recent: south of New Caledonia
Typhina

**vokesae* Gertman, 1969. *Pterotyphis (Tripterotyphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7(4):143-191, pls. 1-8 (p. 184, pl. 8, figs. 3a, 3b)
Late Lower Miocene: Florida
Tripterotyphis [G, EV]

**waltonensis* [as *harrisi waltonensis*] Mansfield, 1935. *Typhis*
Mansfield, Wendell C. 1935. New Miocene gastropods and scaphopods from Alaqua Creek, Florida. Bull. Florida Geol. Surv. 12, 64 pp., 5 pls. (p. 38, pl. 5, fig. 9)
Upper Miocene: Florida
Talityphis

wellsi Houart, 1985. *Typhis (Typhis)*
Houart, Roland. 1985. Description of two new muricacean species (Gastropoda: Muricidae) from Sri Lanka and Western Australia. Jour. Malac. Soc. Aust. 7(1-2):89-93, pls. 1-2 (pp. 90-91, pl. 2, figs. 1-3)
Recent: Port Hedland, Western Australia
Typhis

**wenzelidesi* Hörnes, 1856. *Murex (Typhis)*
Hörnes, Moriz. 1856. Du fossilen mollusken des Tertiär-Beckens von Wien. Abh. K.K. Geol. Reichsanstalt 3(1-10):1-736, pls. 1-52 (p. 264, pl. 26, figs. 12A-D)
Middle Miocene: Hungary
Tripterotyphis

**woodringi* Gertman, 1969. *Siphonochelus (Pilsbrytyphis)*
Gertman, Richard L. 1969. Cenozoic Typhinae (Mollusca: Gastropoda) of the western Atlantic region. Tulane Stud. Geol. Paleont. 7:143-191, pls. 1-8 (pp. 180, 182, pl. 7, figs. 6a, 6b)
Pliocene: Panama
Pilsbrytyphis (Type)

yatesi Crosse and Fischer, 1865. *Typhis*
Crosse, Hippolyte, and Paul Fischer. 1865. Description d'espèces nouvelles de l'Australie méridionale. Jour. Conchyl. 13(1):38-55, pls. 1, 2 (p. 54, pl. 2, fig. 3)
Recent: Golfe de St. Vincent, South Australia
Typhina [V., RD]

**zelandica* Hutton, 1873. *Typhis*
Hutton, Frederick. W. 1873. Catalogue of the Tertiary Mollusca of New Zealand, Wellington. pp. xvi +48 (p. 2). [Figured: Finlay (1926) Trans. & Proc. New Zealand Inst. 57:419, pl. 19, fig. 56]
Pliocene (also Recent); New Zealand
Prototyphis (Type of *Ponderia)*

ANNOTATED ILLUSTRATIONS OF RECENT AND FOSSIL SPECIES IN TYPHIDAE

All the drawings herein were made with the aid of a Wild dissecting microscope with a camera lucida attachment and the sizes of the specimens illustrated (or approximate magnification) are given. Detail drawings, when helpful, are shown with the appropriate species. Explanatory notes, when useful, appear below the drawings.

With the exception of *Distichotyphis vemae* from Keen and Campbell (1964) and the reproduction of *Siphonochelus arcuatus* from Barnard (1959), all the drawings (done over a period of years by the senior author) were made possible by loans of specimens from friends, colleagues, and institutions. Most are not of type material. The majority of the fossil species were received on loan through the kindness of Dr. Emily H. Vokes.

Institution abbreviations used are as follows:

AMNH	American Museum of Natural History
LACM	Los Angeles County Museum of Natural History
SBMNH	Santa Barbara Museum of Natural History
SDNHM	San Diego Natural History Museum
TU	Tulane University
USNM	National Museum of Natural History, Smithsonian Institution

The species illustrated herein are arranged alphabetically by species within subfamilies. Following is an alphabetical listing of those species illustrated with their figure numbers.

SPECIES	FIG.	SPECIES	FIG	SPECIES	FIG	SPECIES	FIG
acanthopterus	98	*clarki*	107	*expansus*	73	*imperialis*	88
alatus	69	*cleryi*	86	*fayae*	32	*japonicus*	63
angasi	25	*colemani*	34	*fimbriatus*	29	*keenae*	59
arcana	31	*coronarius*	46	*fistulosus*	62	*latipennis*	74
arcuatus	61	*coronatus*	109	*floridanus*	56	*linguiferus*	50
belcheri	83	*costaricensis*	47	*francescae*	57	*longicornis*	80
bivaricata	84	*cumingii*	41	*gaasensis*	102	*lowei*	33
bullisi	45	*cuniculosa*	51	*gabbi*	54	*mississippiensis*	89
campbelli	70	*curvirostratus*	48	*gracilis*	49	*montfortii*	90
carmenae	71	*disjuncta*	87	*grandis*	108	*myrae*	39
carolinae	85	*eos*	26	*harrisi*	58	*nipponensis*	64
carolinensis	99	*erythrostigma*	79	*hebetatus*	42	*nitens*	91
		eucteanus	72	*horridus*	43	*norfolkensis*	35

ANNOTATED ILLUSTRATIONS OF RECENT AND FOSSIL SPECIES IN TYPHIDAE

TRIPTEROTYPHINAE

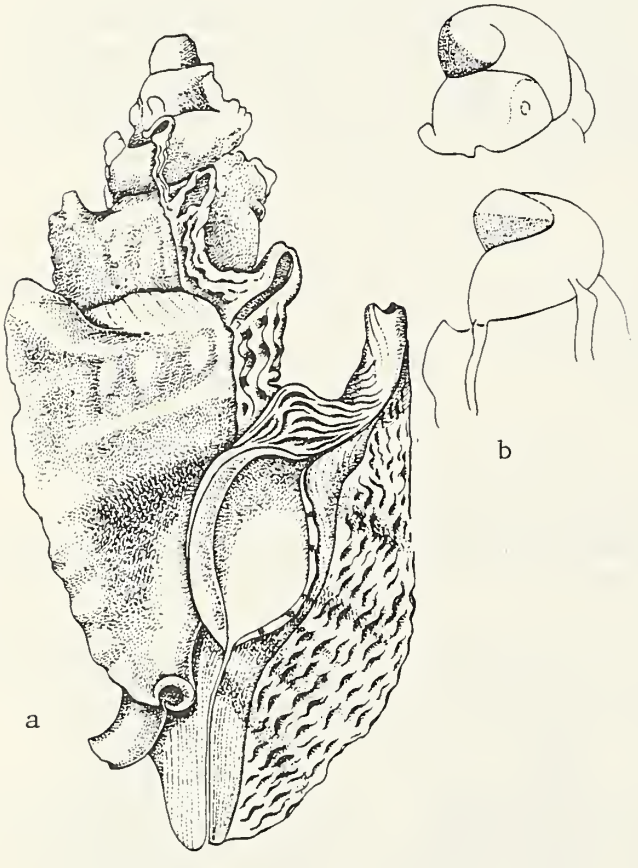


Figure 25. *Prototyphis angasi* (Crosse, 1863), SDNHM 78692, 17.5 mm L, type of *Prototyphis*. Live collected, Long Reef, N.S.W., Australia by P. Cohan, Nov. 1957, donor: R. Burch. (a) apertural view of mature specimen with an almost sealed canal, although lacking an entire peristome. [One live collected specimen studied had a layer of periostracal material sealing the siphonal canal.] Note that the posterior portion of the flange in Tripterotyphinae corresponds to the partition in some Typhinae genera. (b) two views of tabulate protoconch of 2 whorls. See also Radwin & D'Attilio (1974: 95, fig. 58).

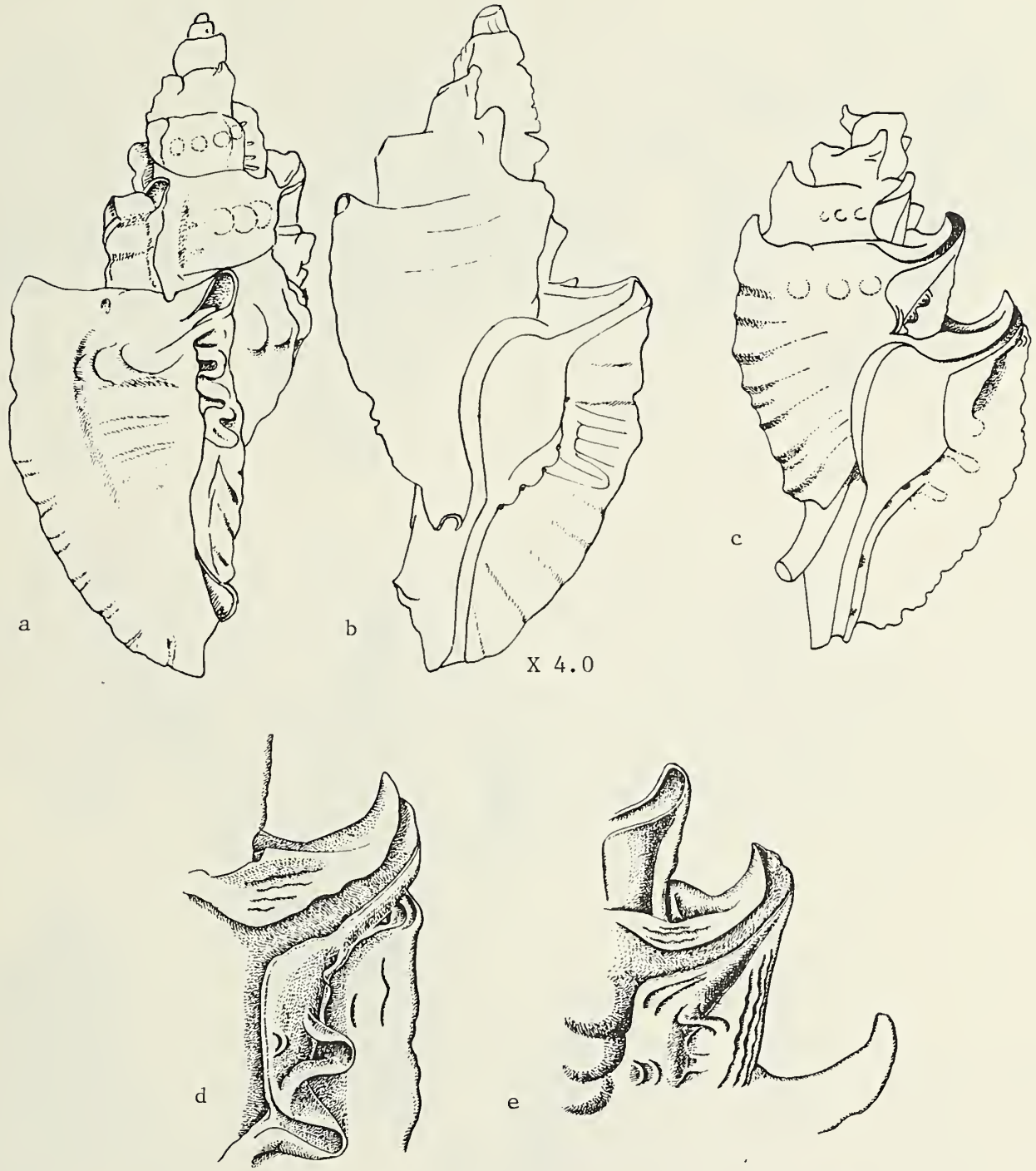
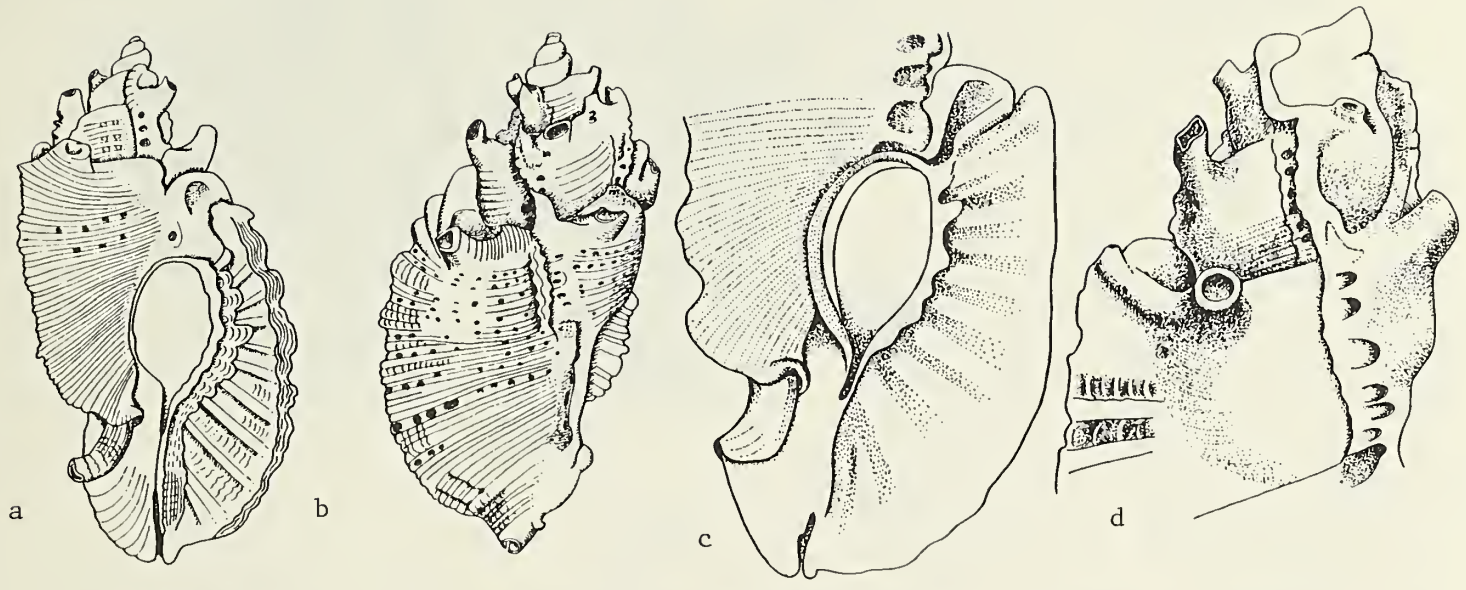


Figure 26 *Prototyphis eos* (Hutton, 1873), (a&b) Bay of Islands, New Zealand in 73.2 m (40 fm) (a) dorsal view (b) apertural view. Specimen in last stages of growth before thickening the outer lip. Note five brown spots on lip edge. (c) apertural view of immature specimen showing brown spots on apertural margin and down along the canal (d&e) details of specimen in (c) highlighting the nature of the open tube which is confluent with the varical spine, 14 mm L.

Figure 27. *Prototyphis paupereques* (Powell, 1974). Poor Knights Island, New Zealand, Glass & Foster coll. This specimen is notable for its apricot and brown coloration. The outer lip is immature.

Figure 28. *Prototyphis zelandicus* (Hutton, 1873). (a&b) 27 mm L, Castle Cliffs, New Zealand, Glass & Foster coll. (a) Although in some *Prototyphis* the anal tube and/or siphonal canal may remain partially open even at maturity, in *P. zelandicus* both tube and canal are sealed. (b) tabulate protoconch of specimen in (a) (c) Although described as a fossil, the species is also Recent. In this subadult Recent specimen also from the Glass & Foster collection, the tube is sealed but the outer apertural lip is incomplete and the canal is open.



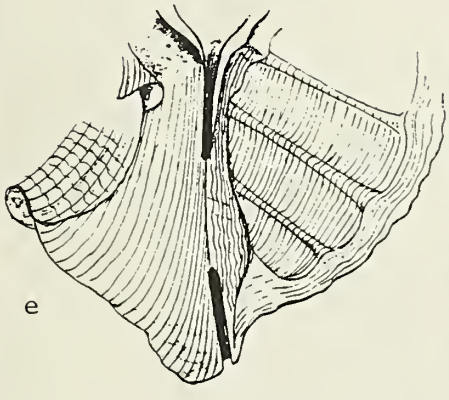


Figure 29. *Pterotyphis fimbriatus* (A. Adams, 1854). (a&b) 23mm L, apertural and dorsal views, ex Purdy coll., Gulf of Nicoya, Costa Rica. In this species the apertural region is depressed rather than projecting as in many typhids. In the dorsal view, the fine lamellae which overlay the undulating spiral cords can be seen. What appear as pits are a result of abrasion of the lamellae covering the spiral cords. (c&d) 35 mm L, La Cruz de Huanacaxtle, Nayarit, Mexico, leg. F.&R. Poorman, Nov. 1976 (c) detail of aperture showing partially closed siphonal canal (d) detail of dorsum showing functioning tube and its apparent "drift" away from the apertural flange (e) detail of siphonal canal in LACM 68-41 specimen.

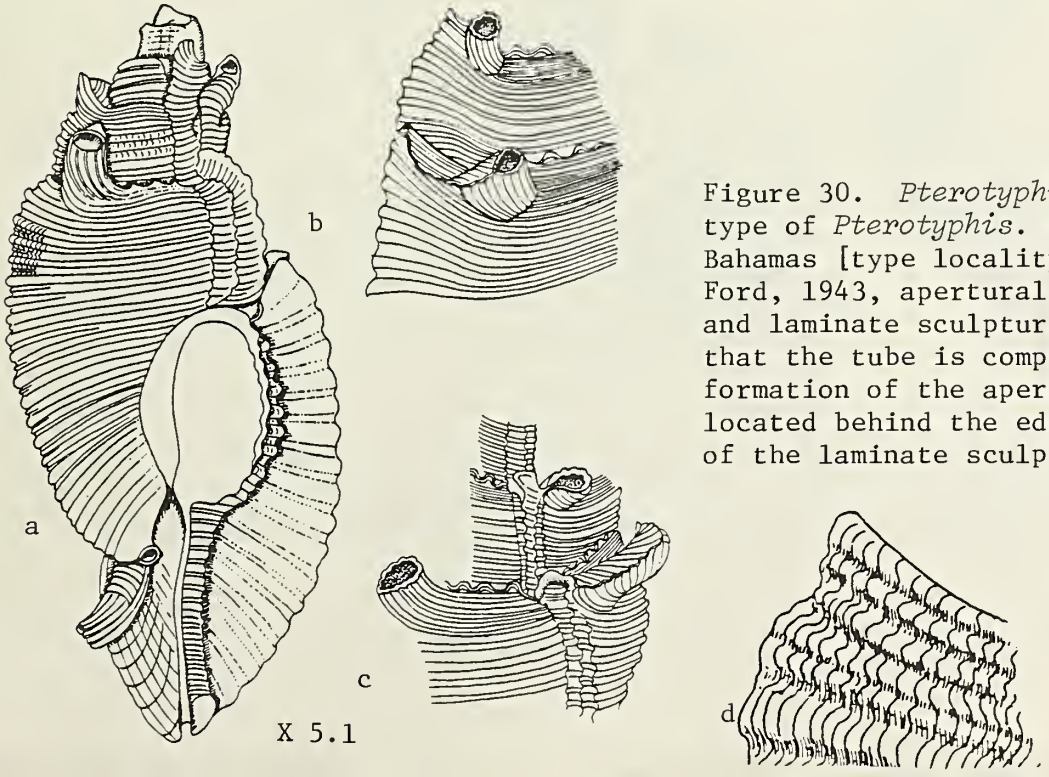


Figure 30. *Pterotyphis pinnatus* (Broderip, 1833), type of *Pterotyphis*. (a) Brown's Pond, Providence, Bahamas [type locality]in deep muck, leg. P.D. Ford, 1943, apertural view showing open canal and laminate sculpture (b&c) details showing that the tube is completed at the time of formation of the apertural varix although it is located behind the edge of the varix (d) detail of the laminate sculpture indicated in (a).

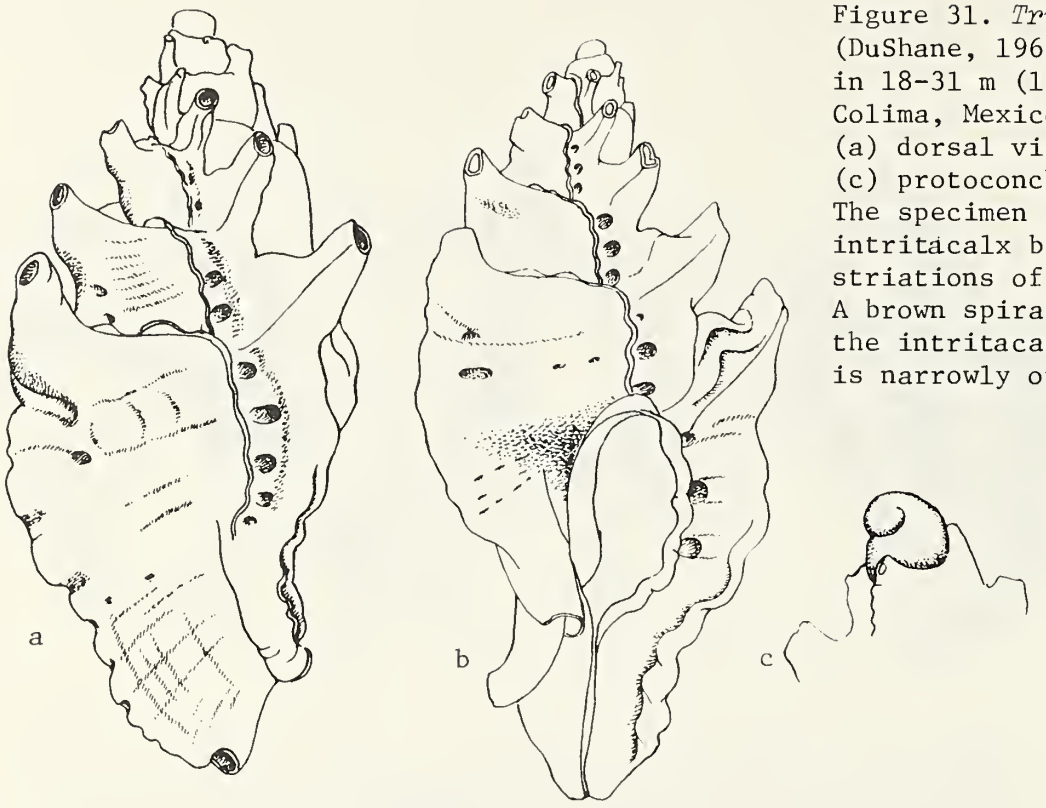


Figure 31. *Tripterotyphis arcana* (DuShane, 1969). SDNHM 80866, 9.8 mm L, in 18-31 m (10-17 fm) near Manzanillo, Colima, Mexico, coll. C.&L. Shy (a) dorsal view (b) apertural view (c) protoconch of 1½ convex whorls The specimen figured has a thin intritacalx below which the axial striations of the shell can be seen. A brown spiral band appears where the intritacalx is abraded. The canal is narrowly open.

Figure 32. *Tripterotyphis fayae* (Keen and Campbell, 1964). (a&b) SDNHM 52024, 26 mm L, Tamarindo Cove, Tenacatita Bay, Jalisco, Mexico, leg. D.R. Shasky, apertural and dorsal views (c) protoconch (2 views) of a dwarf white specimen from Cabo Pulmo, Mexico, which appears to differ only in size and color.

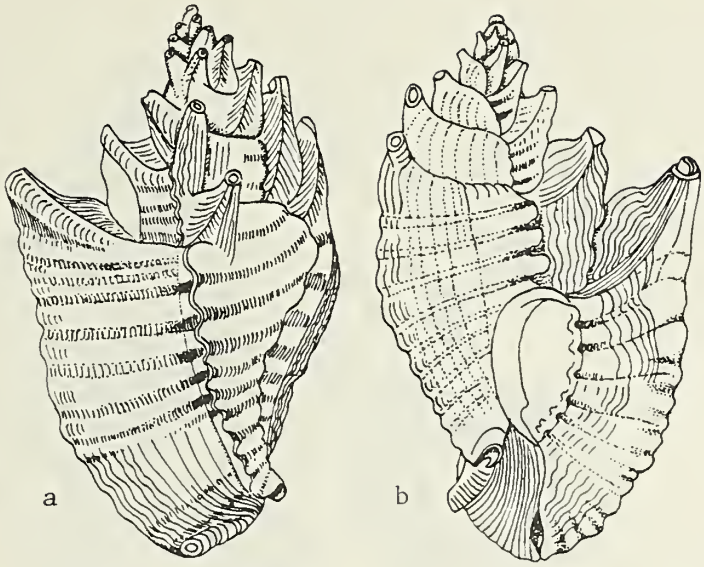
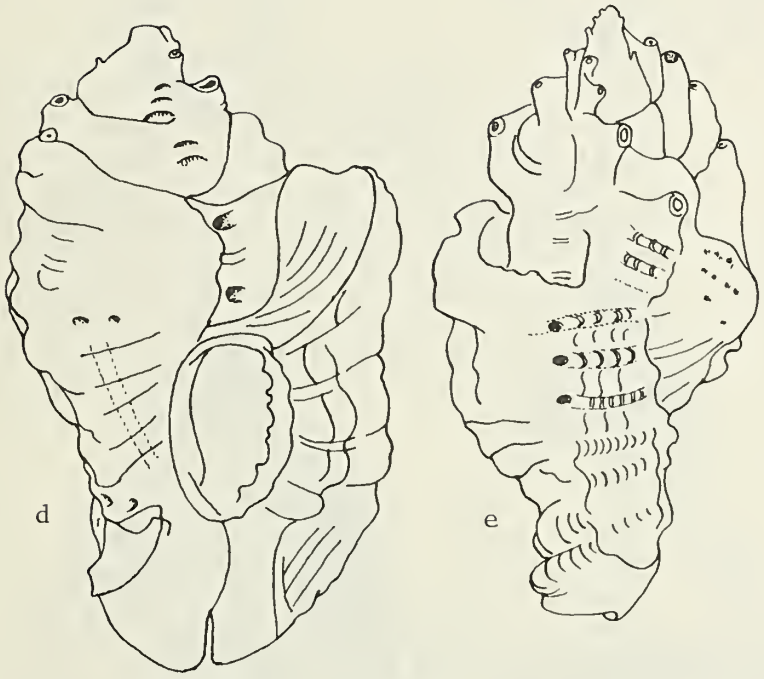


Figure 33. *Tripterotyphis lowei* Pilsbry, 1931. (a-c) paratype, SDNHM 23178, 15.2 mm L, Tres Marias Is., Mexico, leg. H.N. Lowe, Mar. 1930. (a&b) dorsal and apertural views. In *T. lowei*, intritacalx forms a scallop pattern opposite the direction of growth of the shell. The tube is typical of Tripterotyphinae; it is part of the apertural flange, the upper portion of which forms the tube. (c) detail of canal showing the left side of the posterior portion slightly overlapping the right side. On the anteriormost portion of the canal, however, there is no overlap. (d&e) dorsal and apertural views of *T. lowei* from Sullivan Bay, Bartholome Is., Galapagos Is., Ecuador in from 0.9-3.0 m (3-10 ft), leg. D. Mulliner, Mar. 1971. Note that this is a much stouter specimen than the one in (a&b).



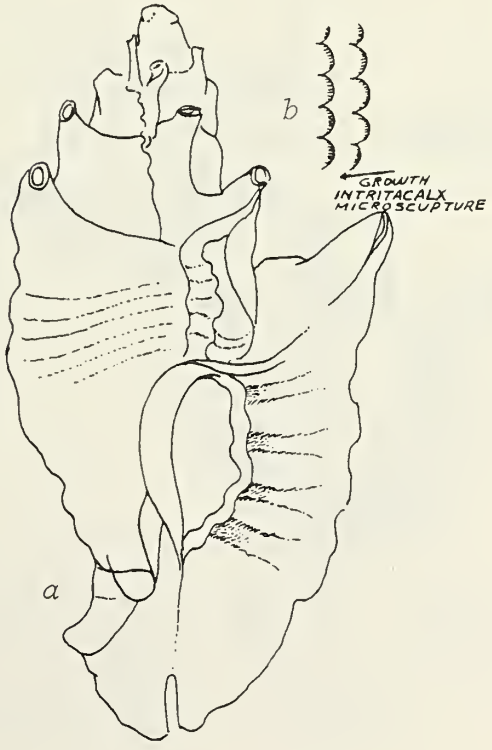


Figure 34. *Tripterotyphis lowei colemani* (Ponder, 1972), SDNHM 82096, 10.2 mm L, entrance to Pt. Broome, West Australia, under rock slab at low tide, ex Pisor coll. (a) apertural view (b) detail of microsculpture of the intraticalx with the arrow showing the direction of growth. This subspecies is more slender than typological material of *T. lowei*.

Figure 35. *Tripterotyphis norfolkensis* (Fleming, 1962). S coast of Norfolk Is. Australia, E. Wright coll. This species is very close in shell characters to the Galapagan *T. lowei* shown in Figure 34.

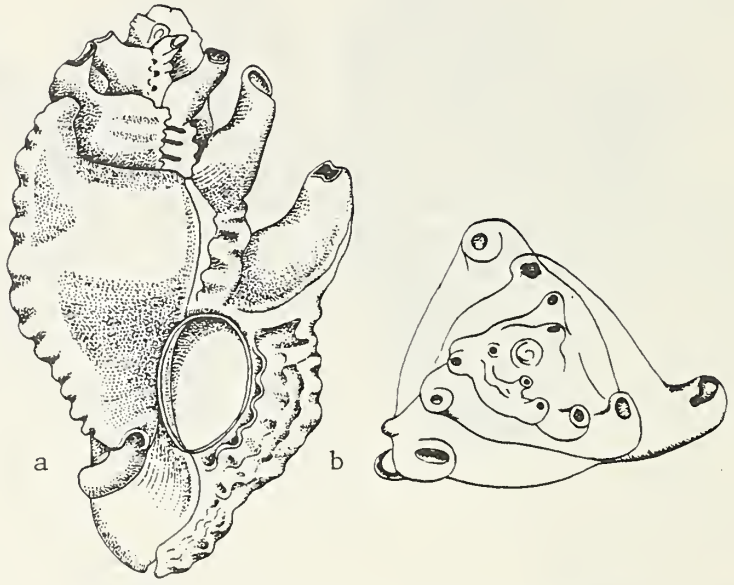


Figure 36. *Tripterotyphis robustus* (Verco, 1895). SDNHM 73699, 12.2 mm L, Smoky Bay, S. Australia in ± 80 m, ex J. Phillips coll. (a) apertural view (b) top view showing the alignment of the tubes. As in the generic type, *T. lowei*, the tube is part of the apertural flange, the upper portion being the tube. In this specimen the siphonal canal closes by overlapping the left side over the right with the anterior portion open.

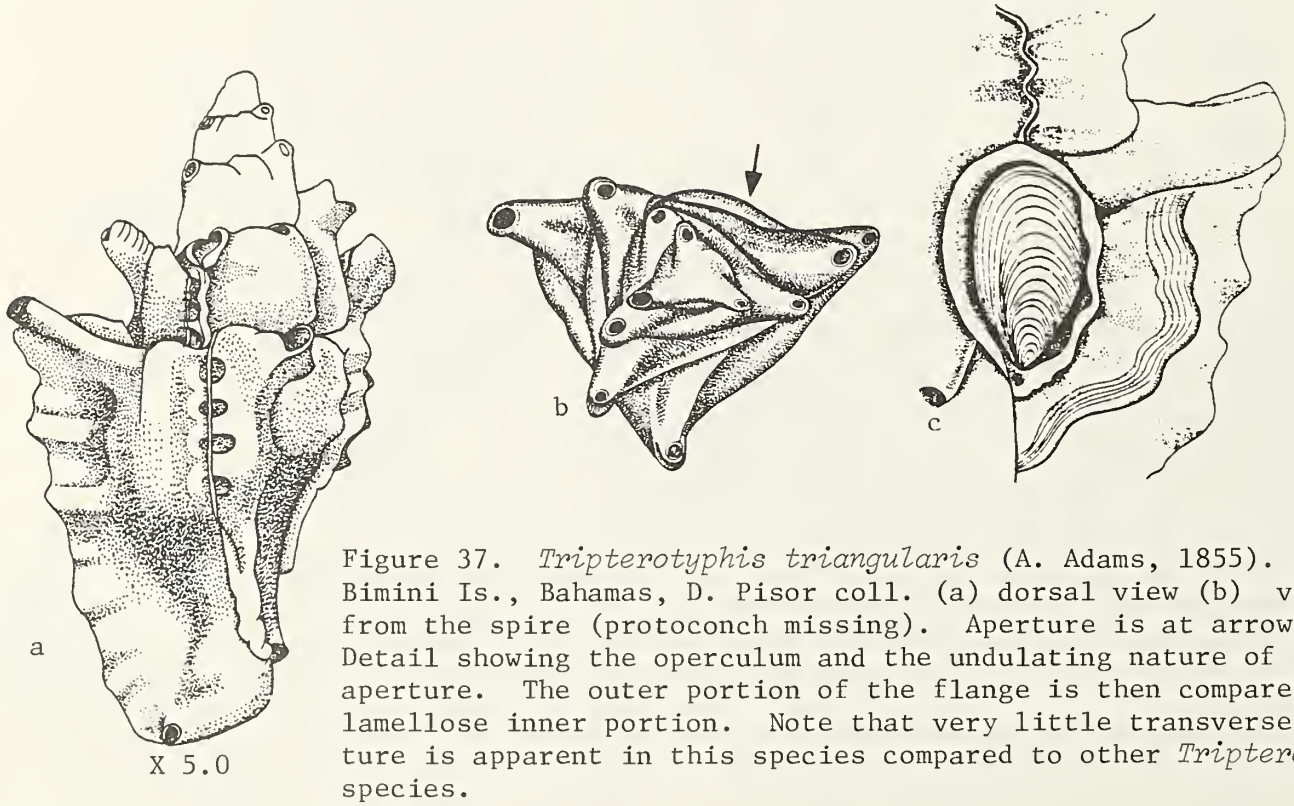


Figure 37. *Tripterotyphis triangularis* (A. Adams, 1855). S. Bimini Is., Bahamas, D. Pisor coll. (a) dorsal view (b) view from the spire (protoconch missing). Aperture is at arrow. (c) Detail showing the operculum and the undulating nature of the aperture. The outer portion of the flange is then compared to the lamellose inner portion. Note that very little transverse sculpture is apparent in this species compared to other *Tripterotyphis* species.

X 5.1

Figure 38. **Tripterotyphis vokesae* (Gertman, 1969). TU 591, Lower Miocene, Florida (a) apertural view (b) protoconch of ±2½ whorls. In this specimen the siphonal canal is completely sealed and as in most Tripterotyphinae, bears both axial and transverse sculpture.

SUBFAMILIAL ASSIGNMENT UNDETERMINED

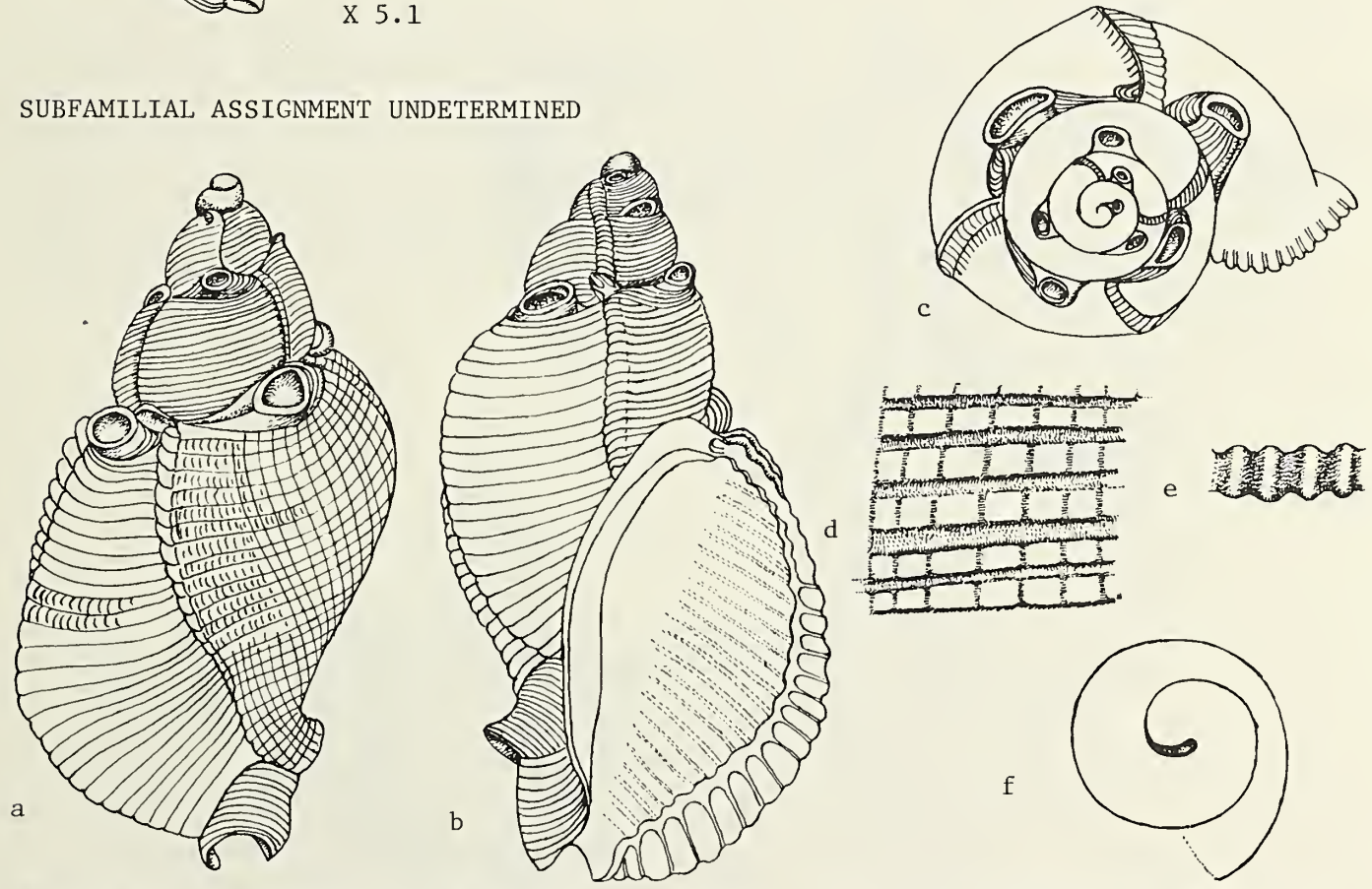


Figure 39. *Cinclidotyphis myrae* DuShane, 1969, type of *Cinclidotyphis*. ± 19 mm L (a&b) dorsal and apertural views (c) view from spire (d)detail showing sculpture of concentric rows of spiral cords cut by axial grooves forming a cancellate pattern (e) detail of one row of cords. Although this species is trivaricate, its broadly open aperture and its Muricinae radula (flattened rather than strongly arched as in Tripterotyphinae) make its subfamilial placement questionable. (f) protoconch of 2 ¼ whorls.

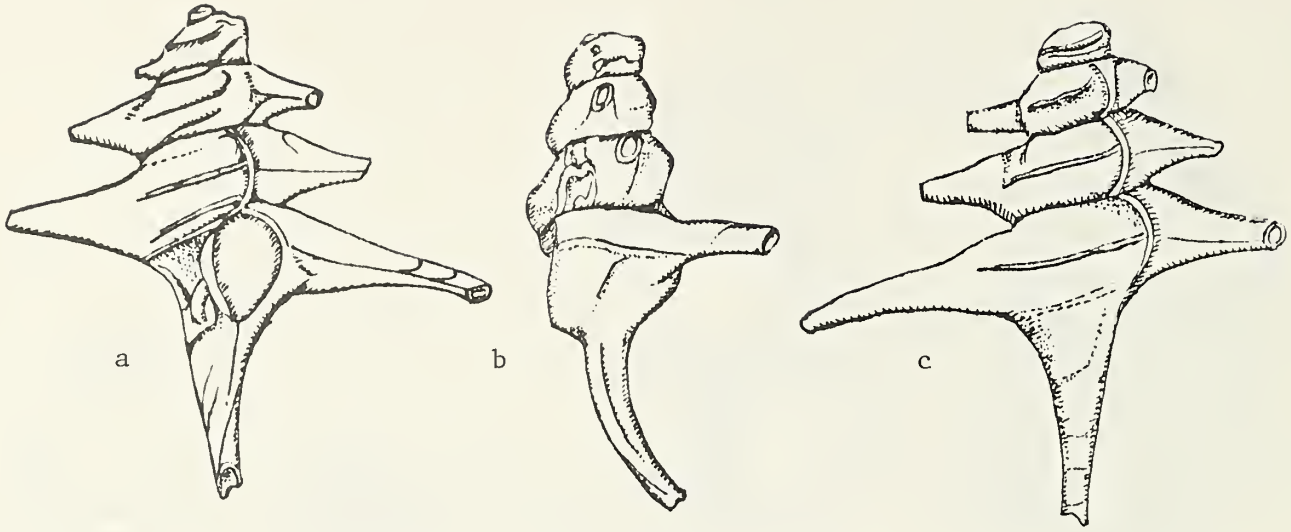


Figure 40. *Distichotyphis vemae* Keen and Campbell, 1964. type of *Distichotyphis*. 3 mmL (after Keen and Campbell, 1964) (a-c) three views. This genus and species are unique and do not seem to be related morphologically to any other typhid.

TYPHINAE

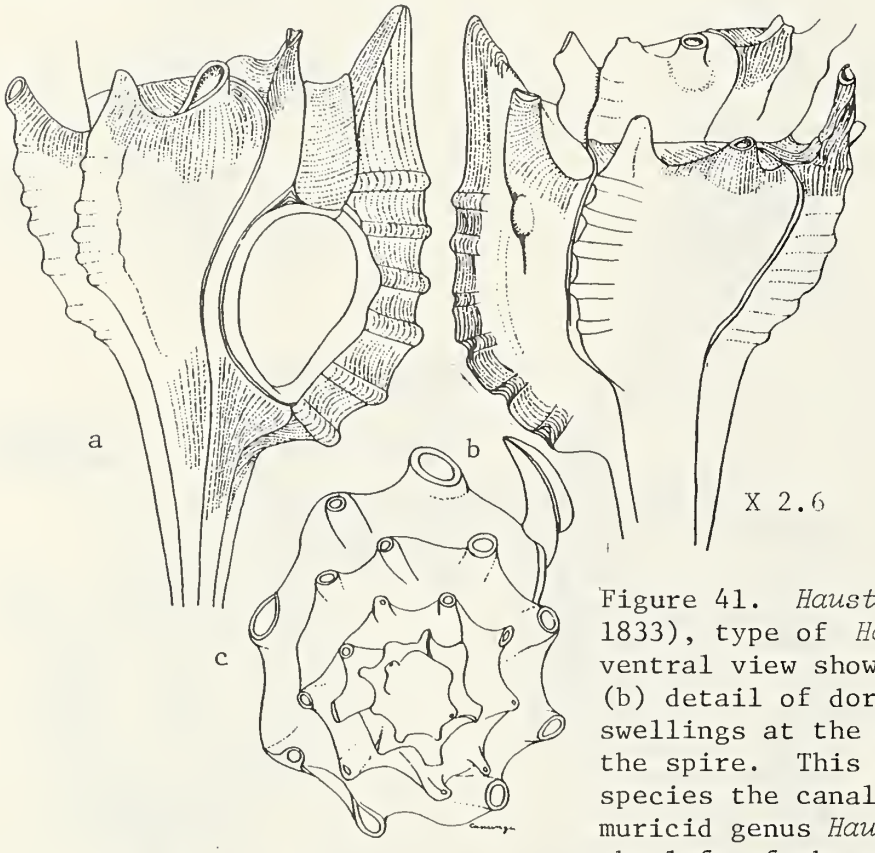


Figure 41. *Haustellotyphis cumingii* (Broderip, 1833), type of *Haustellotyphis*. (a) detail of ventral view showing the sculpture on body whorl (b) detail of dorsum of body whorl showing swellings at the base of the tubes (c) view from the spire. This is a monotypic genus. In this species the canal is straight reminiscent of the muricid genus *Haustellum*, and the suture is to the left of the canal. All varices are rounded until the final varix which has a very large shoulder spine extension with the margin spiny and recurved. The different directions of the incremental growth lines can be seen in (b). Note also the well defined shoulder.

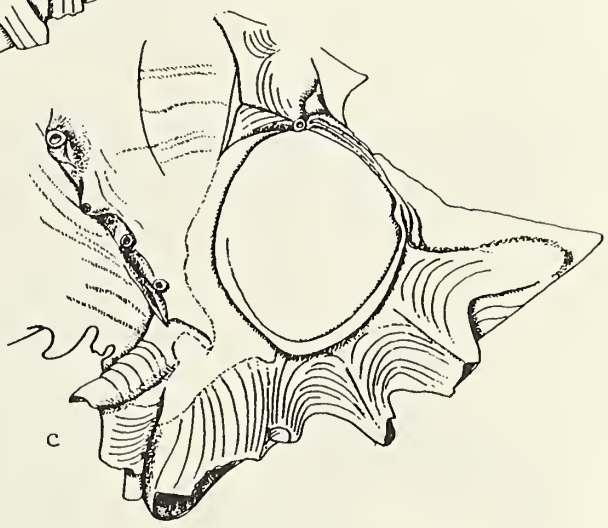


Figure 42. **Hirtotyphis hebetatus* (Hutton, 1877). TU 1369. (a&b) apertural and dorsal view of mature specimen. (The crosshatching indicates areas destroyed or coated with matrix. In this specimen the seam of the siphonal canal is obscured.) (c) apertural view of juvenile specimen in same lot. This species is disproportionately wide for its size with the siphonal canal bent back.

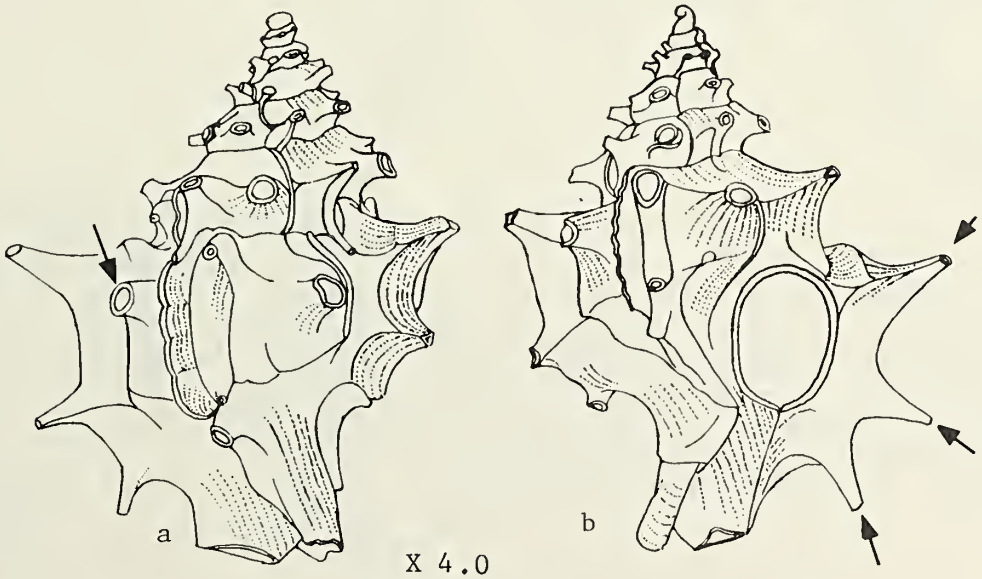


Figure 43. **Hirtotyphis horridus* (Brocchi, 1814), type of *Hirtotyphis*. (a&b) dorsal and apertural views. Note (at arrows) the tubular spines in an axial series which form the flange. The "functional" tube is clear in the dorsal view at arrow.

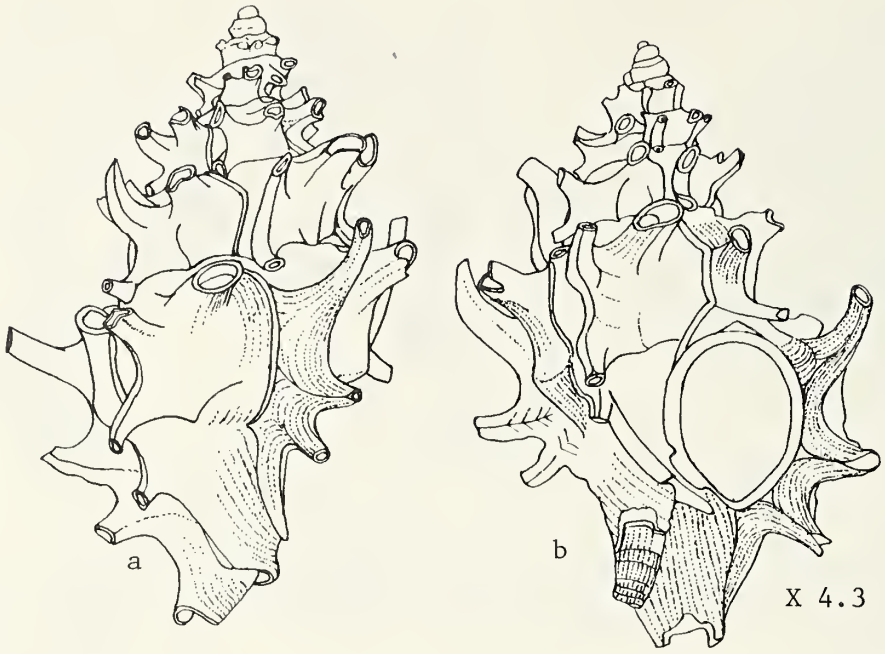


Figure 44. **Hirtotyphis pungens* (Solander *in* Brander, 1776). (a&b) dorsal and apertural views. This species also has the pronounced varical sculpture in the form of tubelike projections typical of *Hirtotyphis*.

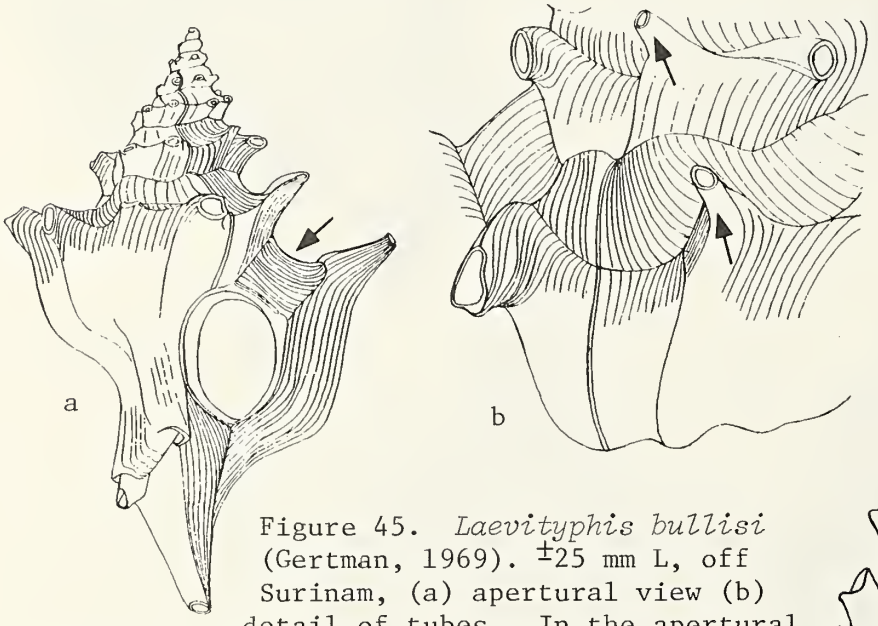


Figure 45. *Laevityphis bullisi* (Gertman, 1969). ±25 mm L, off Surinam, (a) apertural view (b) detail of tubes. In the apertural view the "functioning" tube is hidden by the partition (at arrow). Note the closed tube-like spine on the apertural flange. The detail (b) illustrates the variable direction of tube growth with the arrows indicating closed tubelike spines.

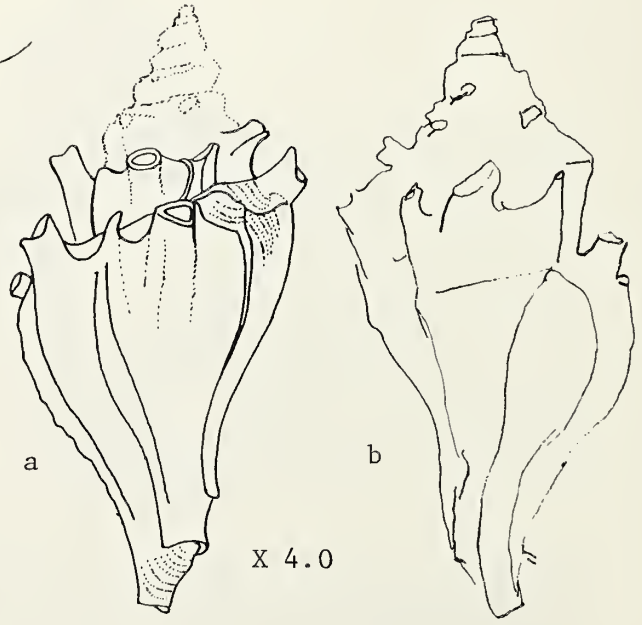


Figure 46. **Laevityphis coronarius* (Deshayes, 1865), type of *Laevityphis*. (a&b) dorsal and apertural views. The apertural aspect of this specimen is in a poor state of preservation.

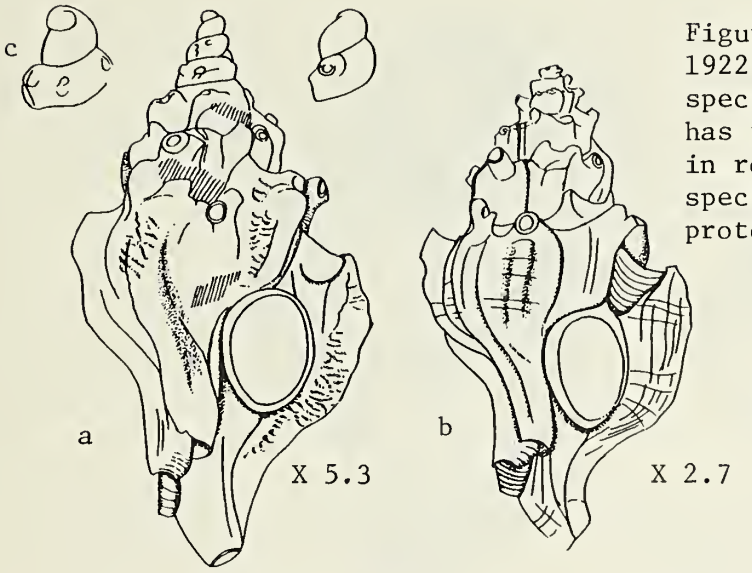


Figure 47. **Laevityphis costaricensis* (Olsson, 1922). TU 1268. (a&b) apertural views of two specimens in the lot. (a) smaller specimen has the entire surface irregularly wrinkled in rounded long or short bumps (b) larger specimen shows no wrinkling (c) two views of protoconch of ±1½ whorls.

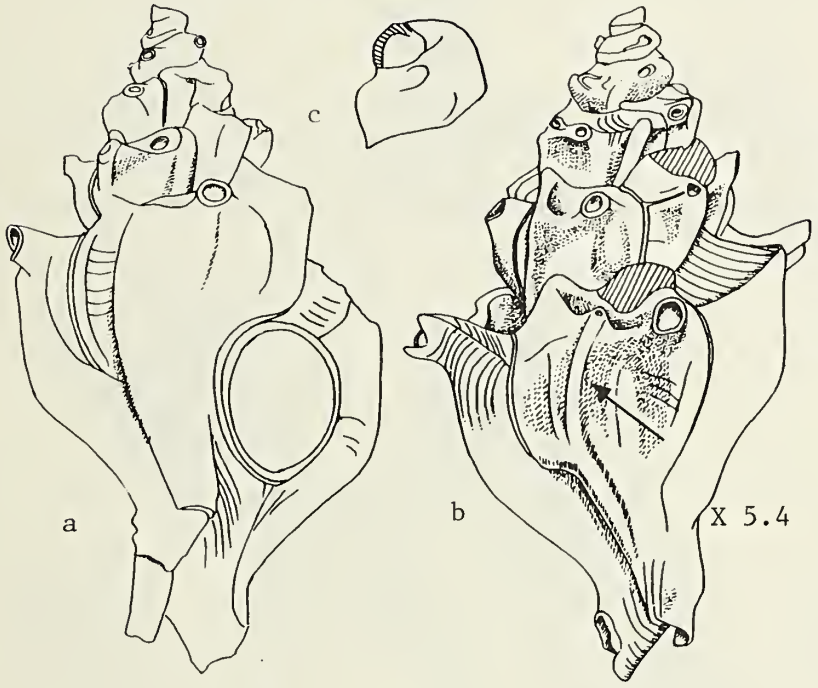


Figure 48. **Laevityphis curvirostratus* (Conrad, 1847). (a&b) apertural and dorsal views (c) partially preserved protoconch. In the dorsal view, at arrow, note the beginning of a seam or pinched area, intervarically, which develops into a pronounced spinose region in some species.

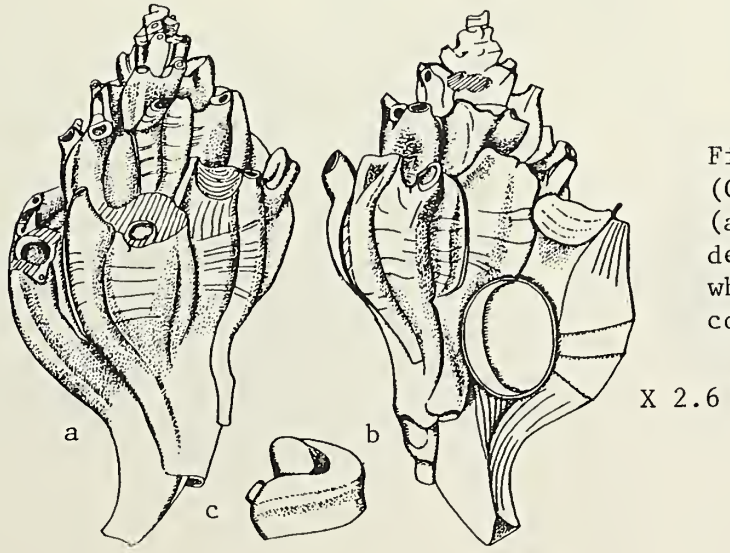


Figure 49. **Laevityphis gracilis* (Conrad, 1833). TU 1203, Panama. (a&b) dorsal and apertural views (c) detail of tabulate protoconch of 1 3/4 whorls. Crosshatching indicates areas covered by foreign matter.

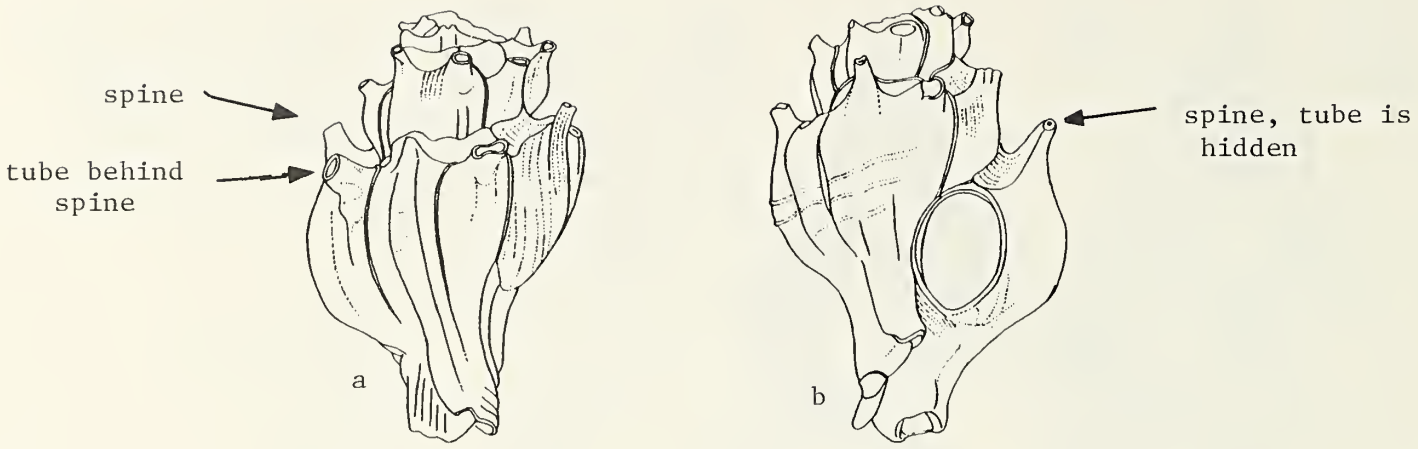
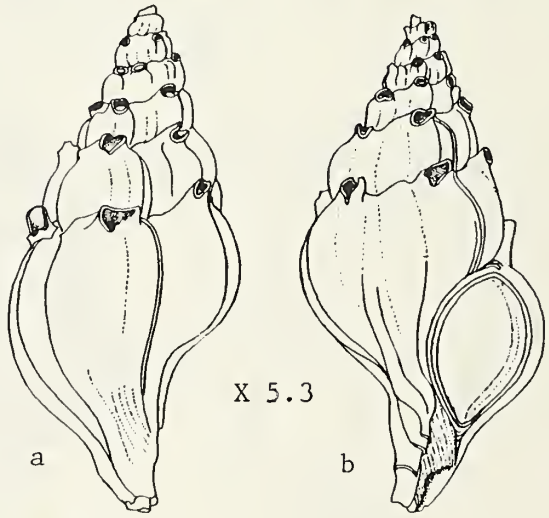


Figure 50. **Laevityphis linguiferus* (Dall, 1890). holotype, 15 mm L, Florida. (a&b) dorsal and apertural views. The specimen is poorly preserved but shows the functioning tube behind the apertural spine.

Figure 51. **Lyrotyphis cuniculosus* (Duchastel *in* Nyst, 1836), type of *Lyrotyphis*. (a&b) dorsal and apertural views. The species has five tubes per whorl and the aperture is lenticulate. Other than its undulating character, the only sculptural elements are the remains of the old varical margins.



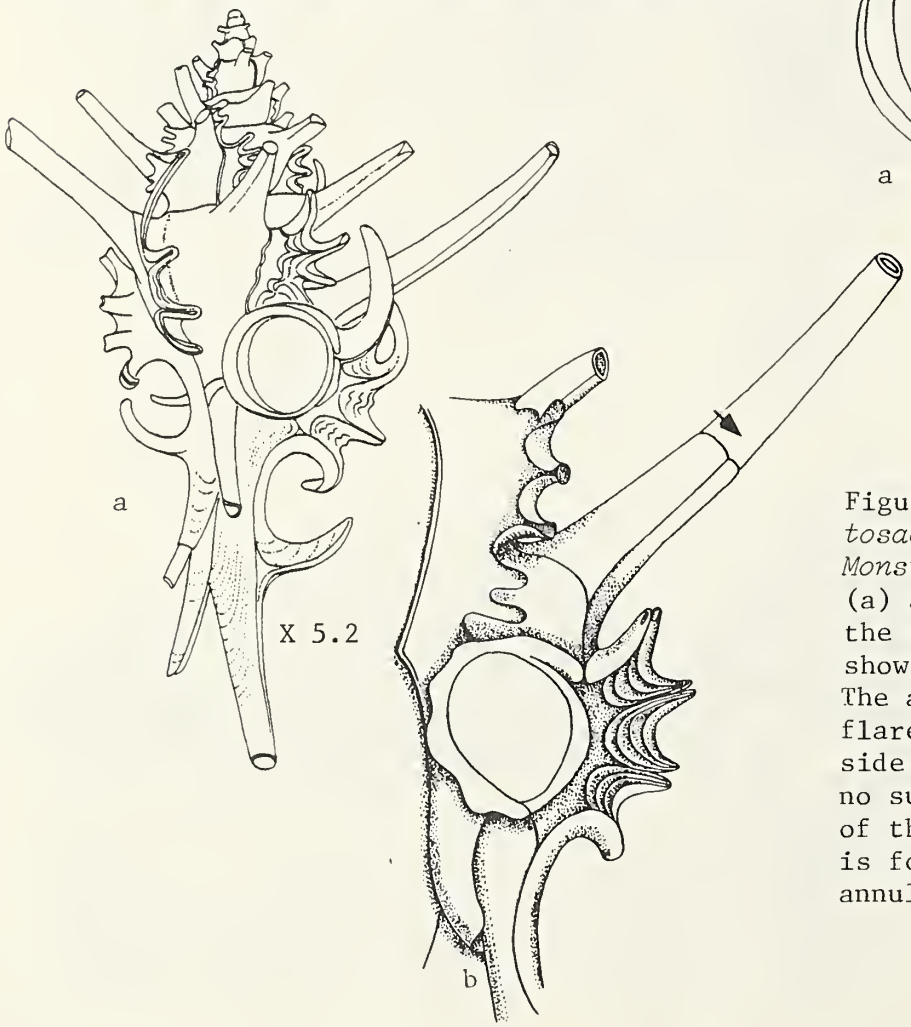


Figure 52. *Monstrotyphis tosaensis* (Azuma, 1960, type of *Monstrotyphis*, a monotypic genus. (a) apertural view (b) detail of the folded over varical flange showing its series of lamellae. The aperture is strongly erect and flares out shelf-like with the left side scalloped. Note that there is no suture on the repaired portion of the tube in (b). This portion is formed by a series of annulated increments.

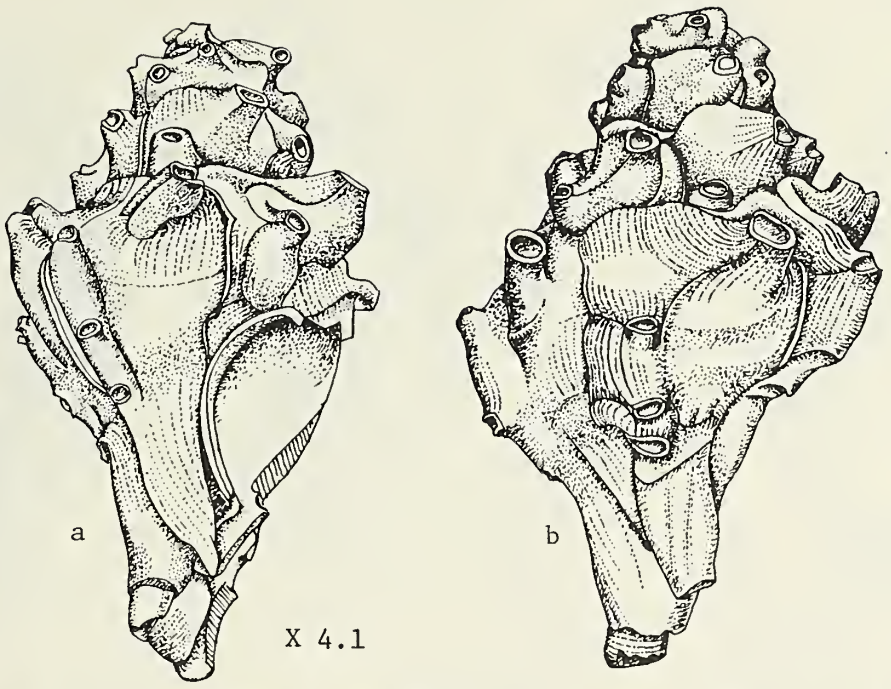


Figure 53. **Neotyphis tepungai* (Fleming, 1943), type of *Neotyphis*. Paratype NZGS 2314, Dannevirke, New Zealand, leg. Laws. (a&b) apertural and dorsal views. The intervarical sculpture of complex folds is drawn up into tubelike openings in this species. A remnant of this sculpture can be seen in the tubelike structure above the aperture.

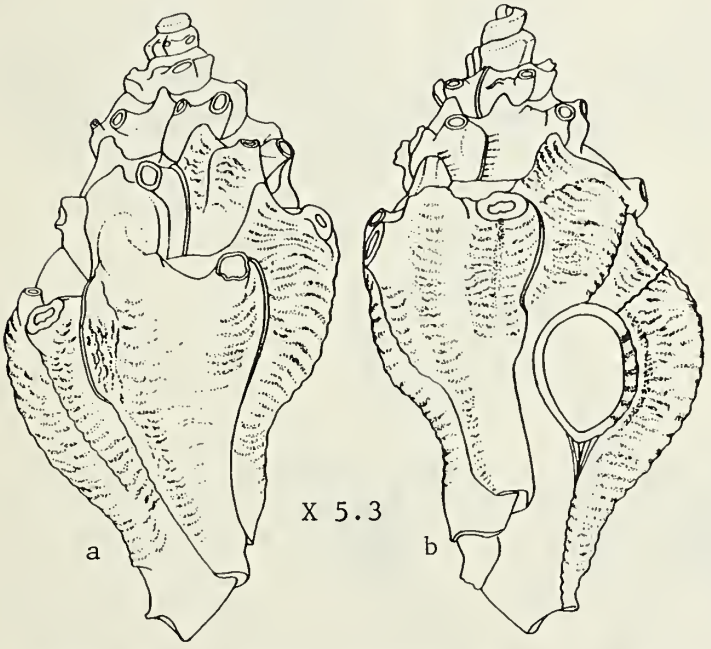


Figure 54. **Pilsbrytyphis gabbi* (Brown and Pilsbry, 1911), type of *Pilsbrytyphis*. (a&b) dorsal and apertural views. The shell surface is strongly wrinkled spirally in this species and the partition stretches across the shoulder, hugging the wall above and acting as a buttress

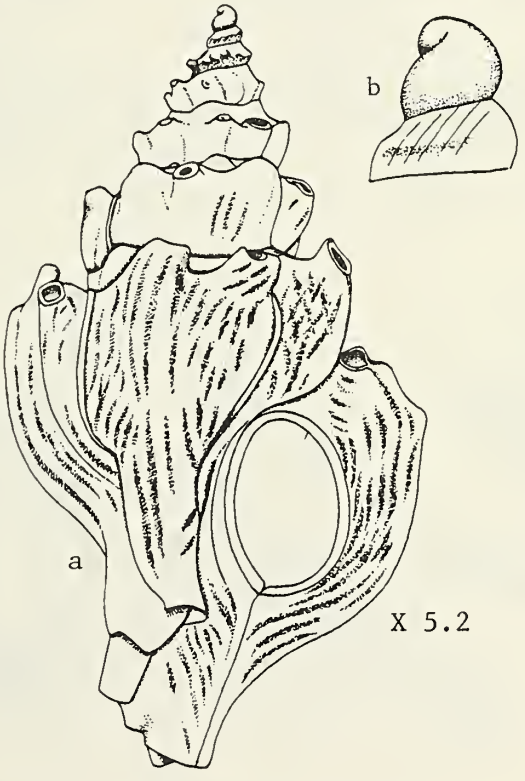


Figure 55. **Pilsbrytyphis woodringi* (Gertman, 1969). near Fort Gallic, Panama, B. Brown coll. (a) apertural view (b) protoconch of $\pm 1\frac{1}{2}$ whorls. This species is notable for its wrinkled surface, mostly axial and somewhat diagonal, as on the canal.

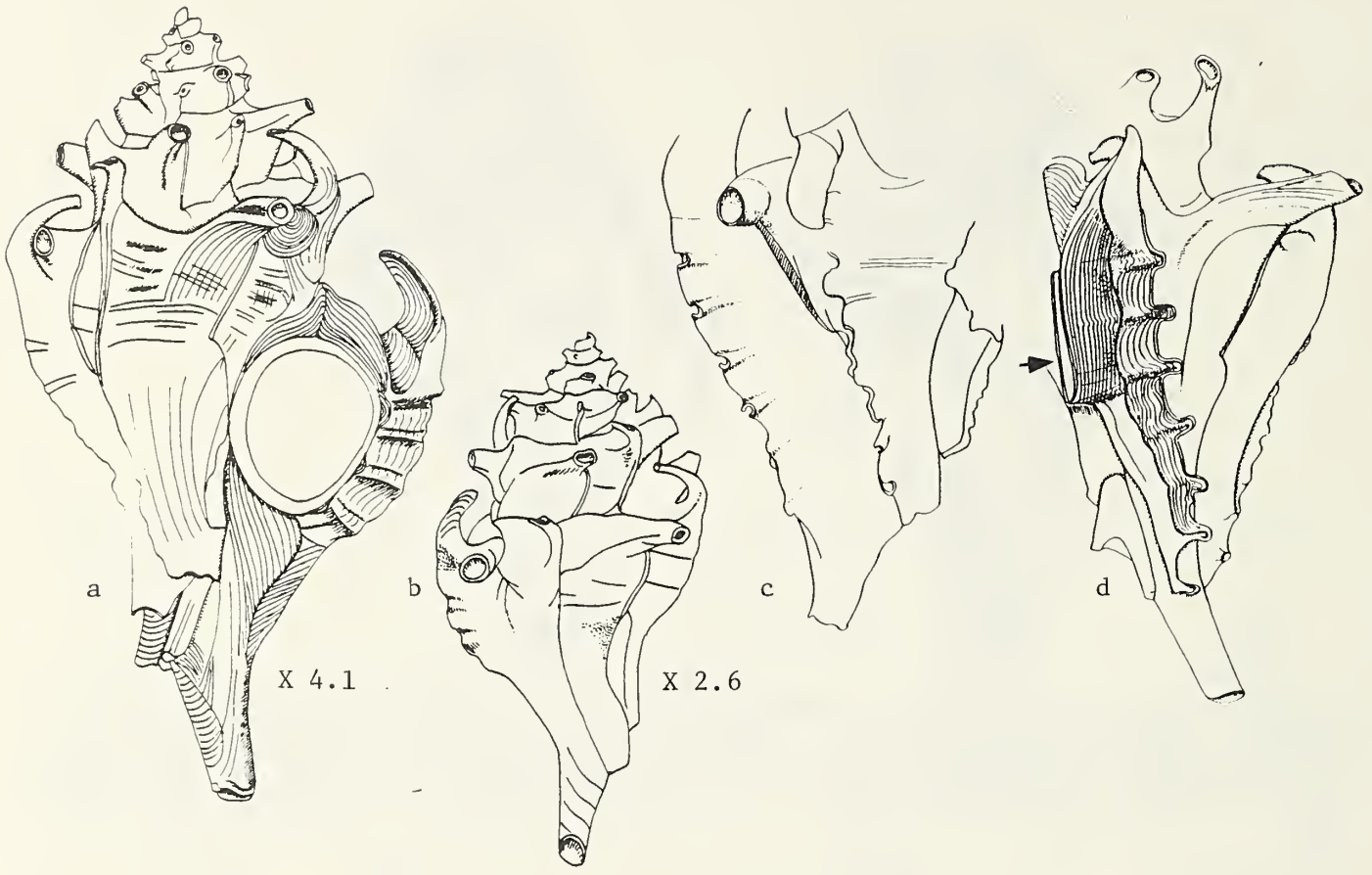


Figure 56. **Rugotyphis floridanus* (Dall, 1889). TU 60 (a) apertural view (b) dorsal view (c) detail of dorsum (d) lateral view of apertural flange which terminates in a spine above. The aperture (see arrow) is strongly erect. The position and direction of the tubes are inconsistent.

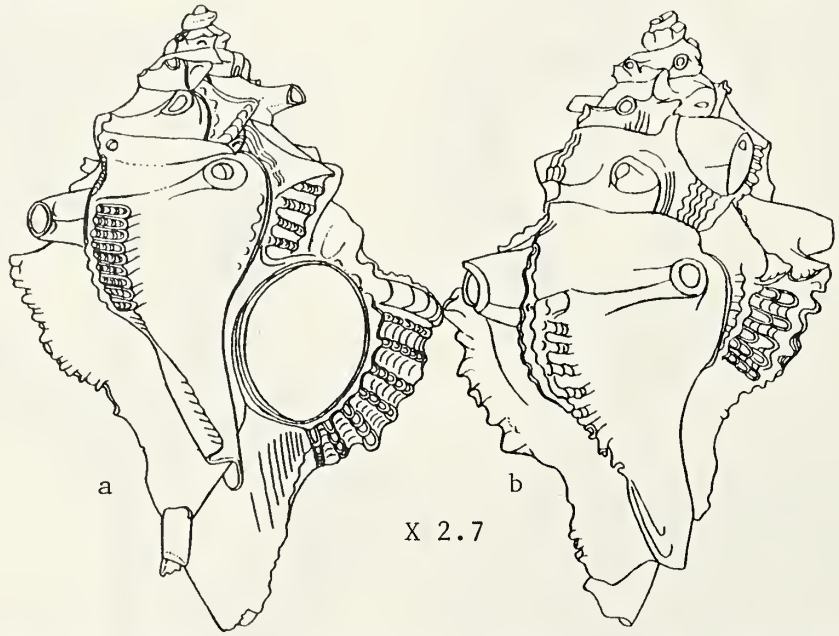


Figure 57. **Rugotyphis francescae* (Finlay, 1924), type of *Rugotyphis*. Clifden, New Zealand, (a) apertural view (b) dorsal view. Although the original description mentions only "a little crinkling" in the center of the "hinder" side of the varix, this fine specimen has the rugose sculpture on both sides of the high varices. Note that the tubes project laterally or horizontally to the axis.

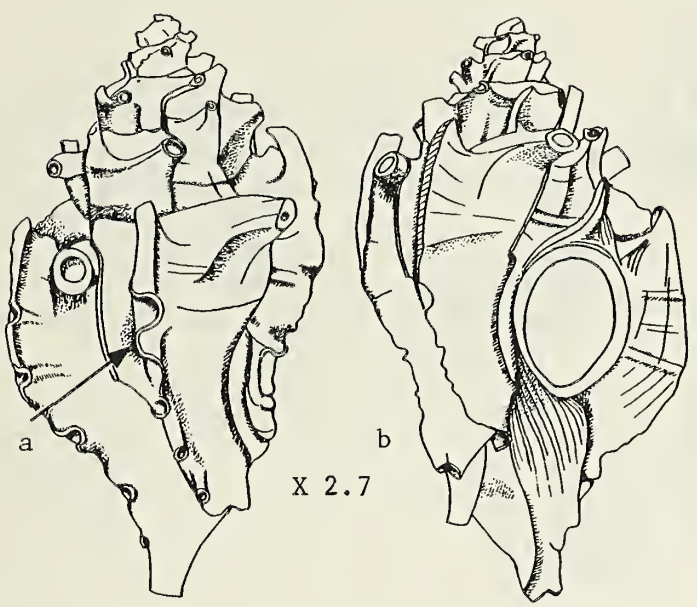


Figure 58. **Rugotyphis harrissi* (Olsson, 1914). TU 932. (a&b) dorsal and apertural views (c) detail of spire with ?incomplete protoconch. This species has a strongly folded intervarical flange as shown in (a) at arrow.

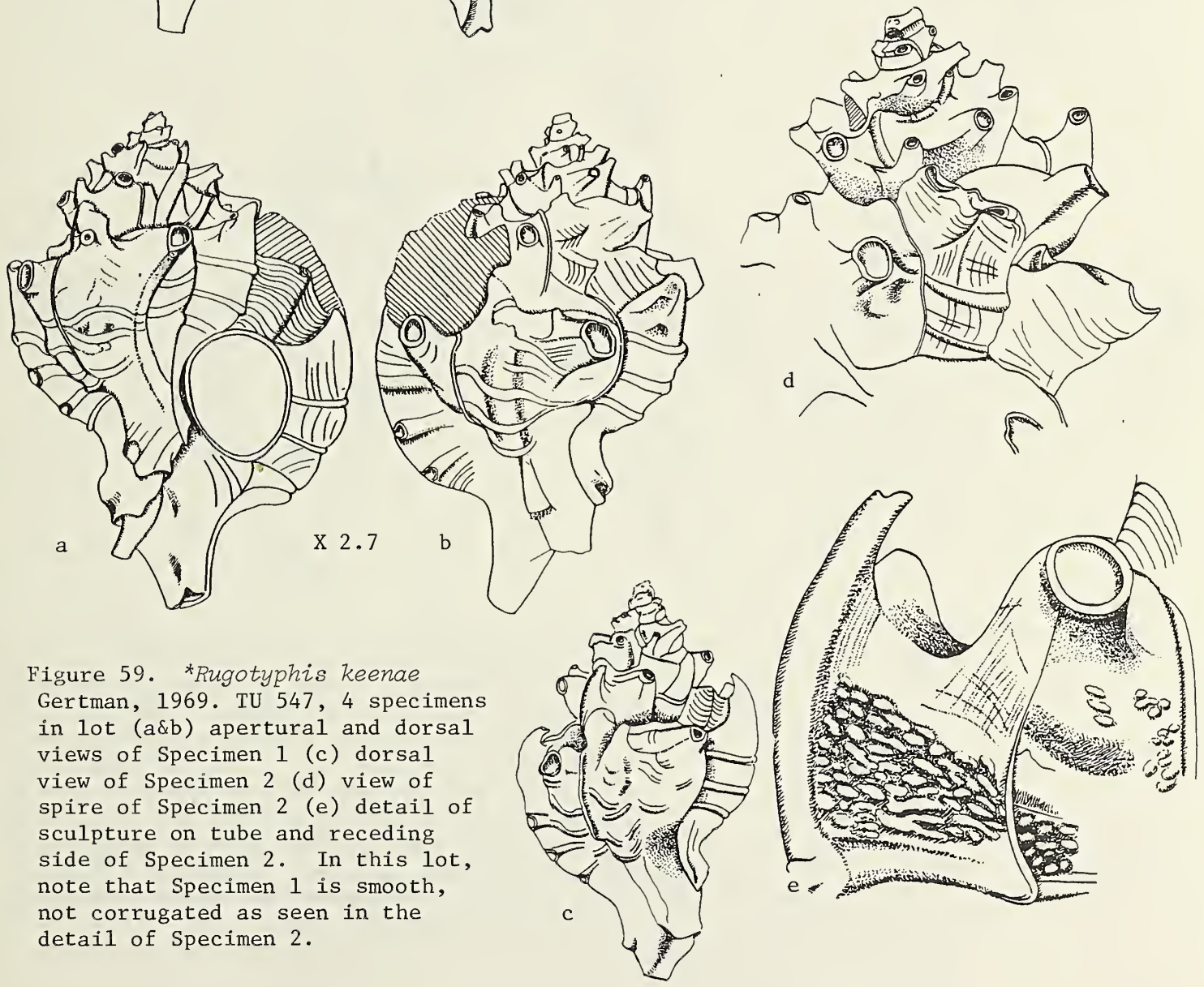


Figure 59. **Rugotyphis keenae* Gertman, 1969. TU 547, 4 specimens in lot (a&b) apertural and dorsal views of Specimen 1 (c) dorsal view of Specimen 2 (d) view of spire of Specimen 2 (e) detail of sculpture on tube and receding side of Specimen 2. In this lot, note that Specimen 1 is smooth, not corrugated as seen in the detail of Specimen 2.

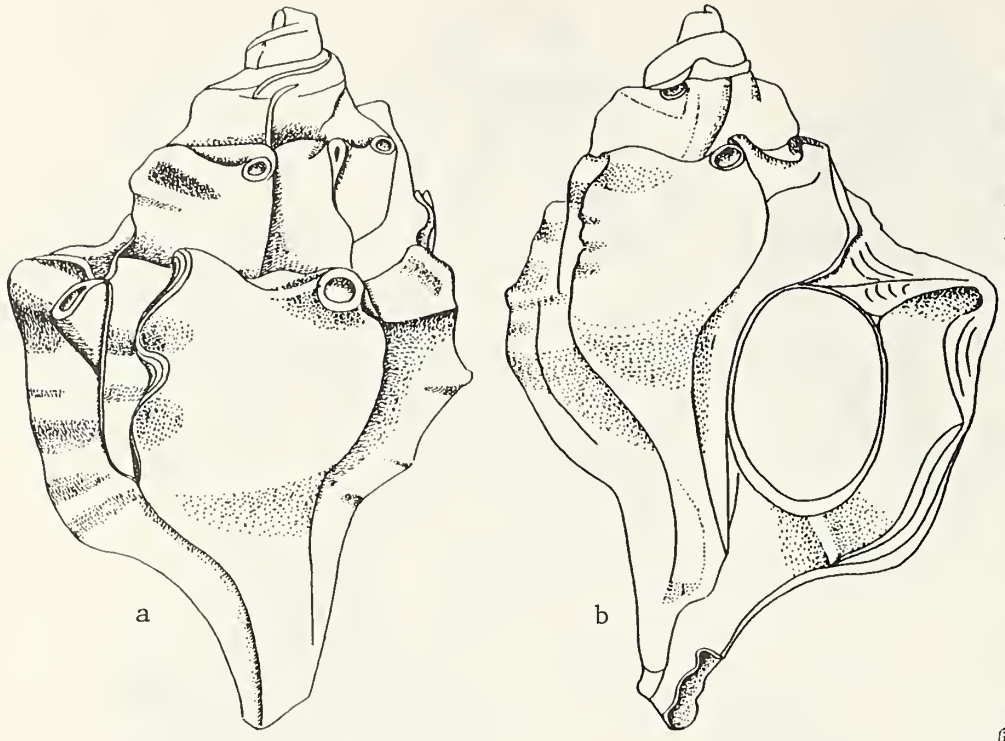
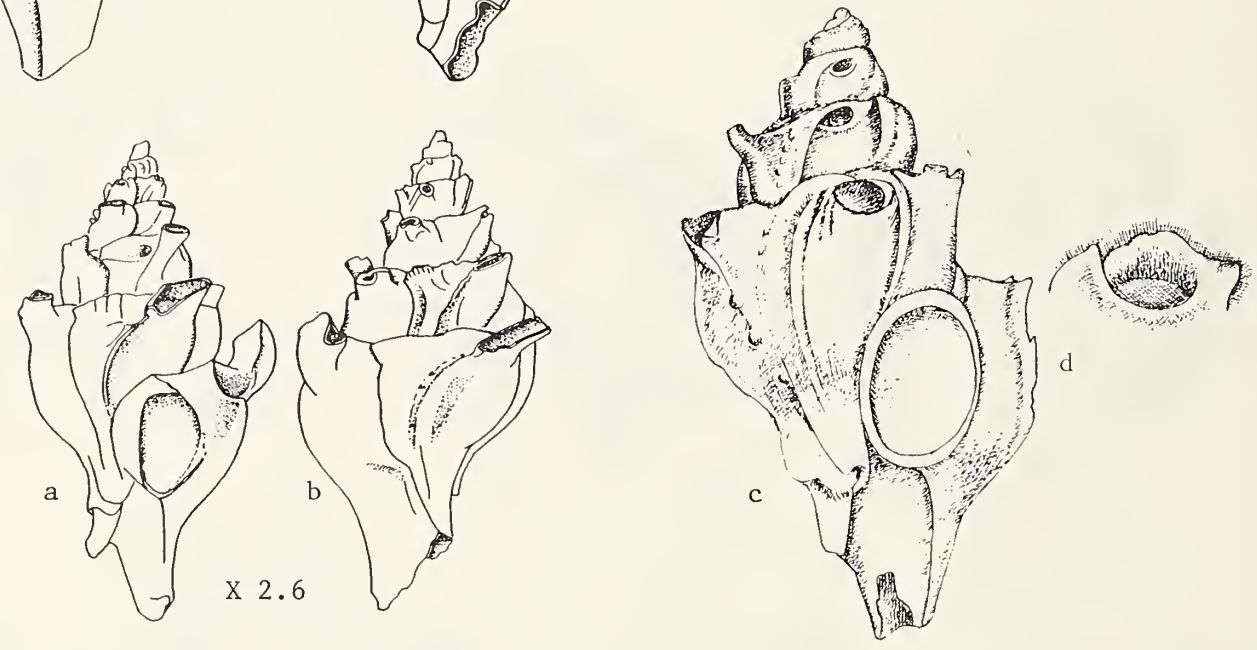


Figure 60. **Rugotyphis stewarti* Vokes, 1983. SDNHM 87714, 30.45 mm L, ex B. Brown coll. (a&b) dorsal and apertural views. This is an immature worn specimen lacking the fourth final varix which most likely accounts for its lack of sculpture.



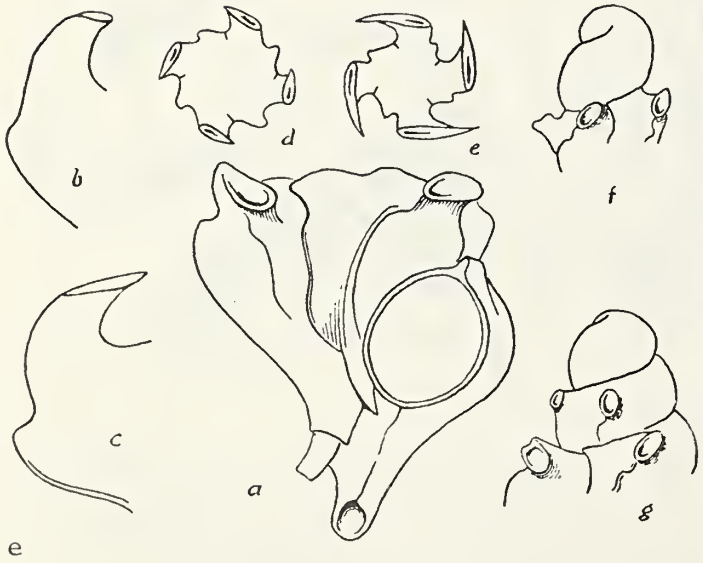


Figure 61. *Siphonochelus arcuatus* (Hinds, 1843), type of *Siphonochelus* (a&b) Agulhas Bank (ex pisces), S. Africa, Foster & Glass coll., apertural and dorsal views (c) apertural view of dead collected specimen (Foster & Glass coll.) showing the axial nodes which are part of the arcuate axial ridge. This sculptural feature distinguishes this species from all other *Siphonochelus* known to us. (d) detail of tube opening in (c) showing its irregular nature (e) after Barnard (1959:210, figs. a-g) Note the spout-like form of the tubes in these schematic drawings.

e

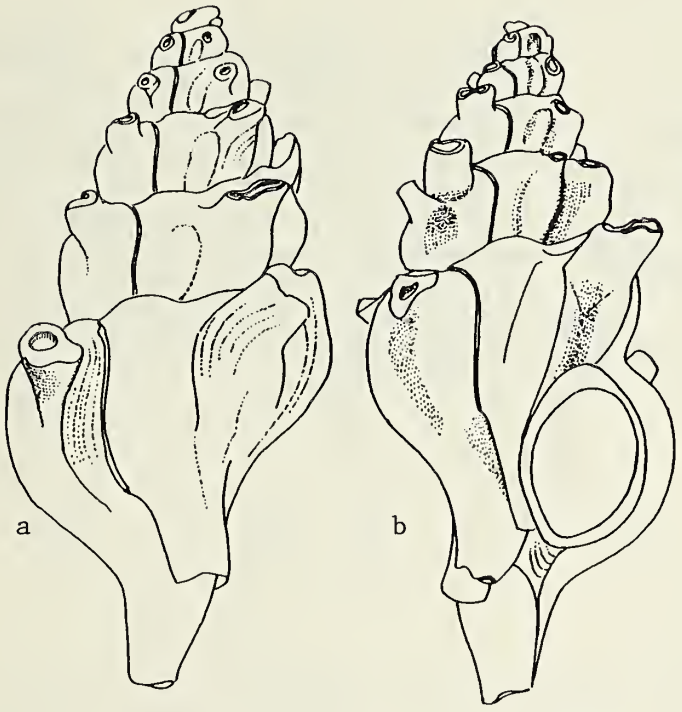


Figure 62. **Siphonochelus fistulosus* (Brocchi, 1814). 14.5 mm L, SBMNH 34487, Voslau, S of Vienna, Austria, Turtonian Formation, (a&b) dorsal and apertural views.

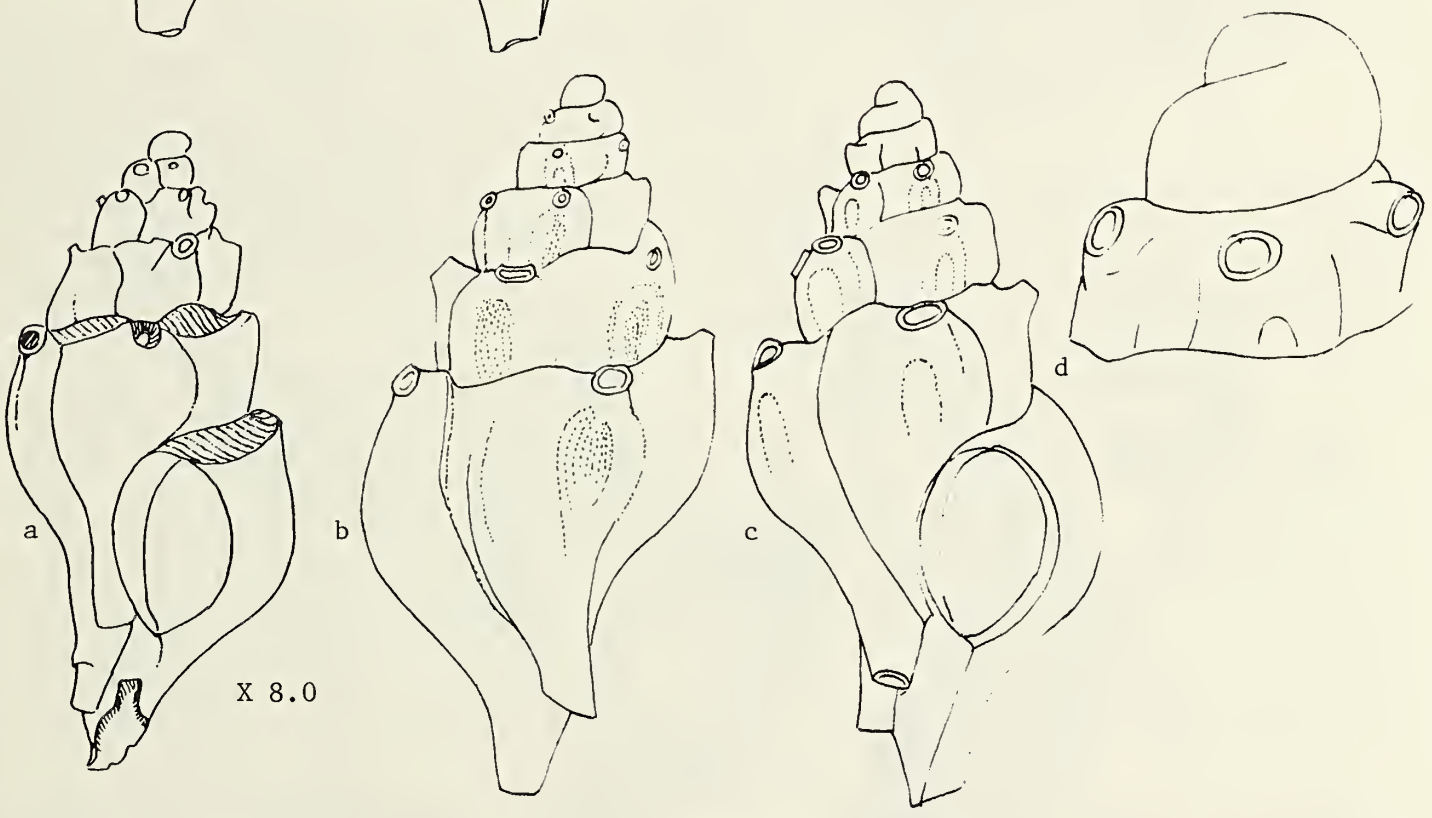


Figure 63. *Siphonochelus japonicus* (A. Adams, 1863). (a) 70 m off Gozo, Wakayama, Japan, apertural view showing strongly developed incremental lines on the shoulder (b-d) 10.3 mm L, Cape Shimonsaki, Wakayama, Japan in 120 m, Glass & Foster coll. (b&d) dorsal and apertural views (d) protoconch of 1½ whorls in (b&c).

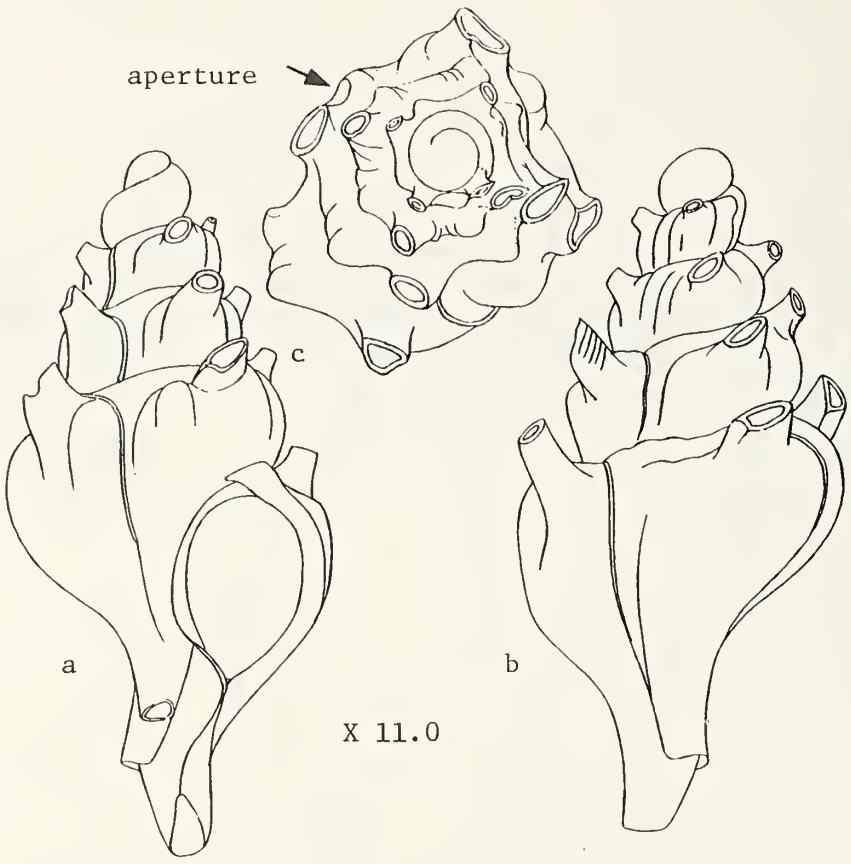


Figure 64. *Siphonochelus nipponensis* Keen and Campbell, 1964. (a&b) apertural and dorsal views (c) view from spire showing the tubes compressed at the sutural area. In *Siphonochelus*, the intervarical area is depressed forming two swellings, one below the tube and the other on the leading side of the tube. This is especially obvious in the view from the spire (c).

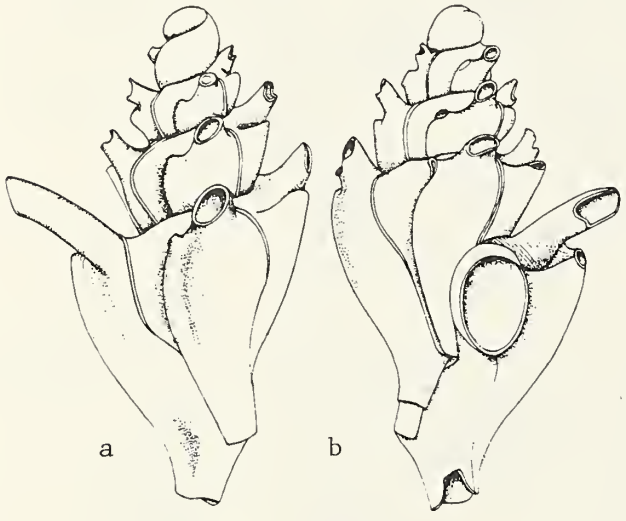


Figure 65. *Siphonochelus radwini* Emerson and D'Attilio, 1979, holotype, AMNH 323198. 5.0 mm L, Cabo Catoche, Yucatan, Mexico. (a&b) apertural and dorsal views. This is the first species of *Siphonochelus* known from either coast of the New World. In this species the development of the sculpture between the tube and the varical margin is transitional between *Siphonochelus* and more elaborated genera.

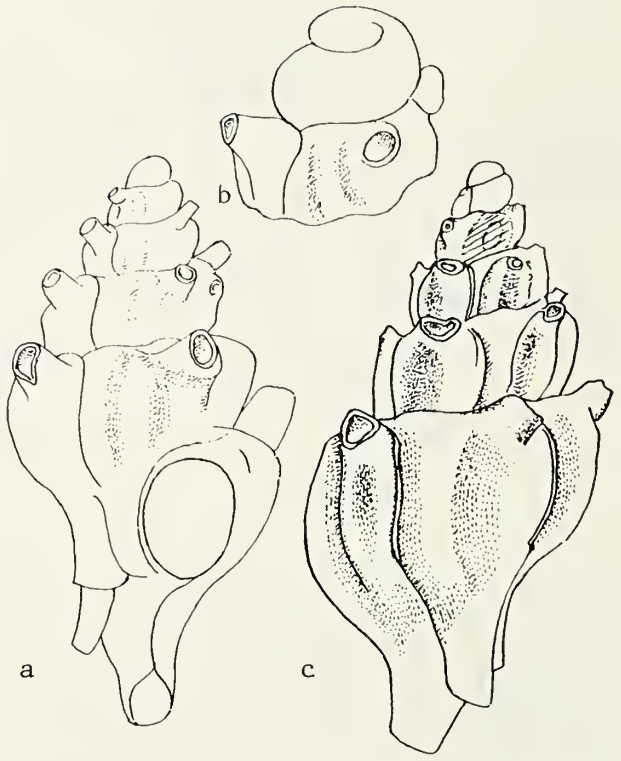


Figure 66. *Siphonochelus solus* Vella, 1961. (a) Westport, New Zealand in 1,000 m, Glass & Foster coll., apertural view (b) protoconch of 1 3/4 whorls in (a) (c) SDNHM 85997, 8.4 mm L, ex B. Brown coll., Cape Moreton, Australia in 82.3 m (45 fm), dorsal view. Note that there is no supporting buttress or varix.

Figure 67. *Siphonochelus stillicandidus* Houart, 1986. 6.8 mm L, off S. Recife Sud, 400-520 m, R. Houart coll. (a&b) apertural and dorsal views (c) protoconch of 1½ whorls. This small glassy species is like the type of *Siphonochelus* in having a ridge between the varical margin and the tube. The area below the tube is depressed.

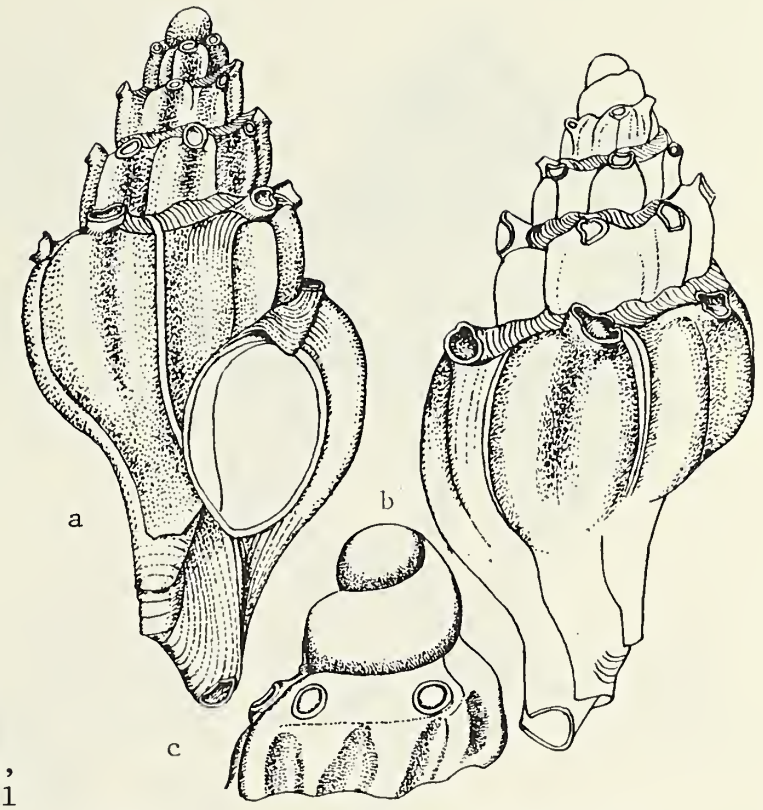


Figure 68. *Siphonochelus syringianus* (Hedley, 1903). SDNHM 24083, 9.4 mm L, Tasmania in 16.5 m (9 fm), leg. H.N. Lowe. (a&b) apertural and dorsal views. Note that the shoulder of fine incremental lines is of one even width and the tube is on the angle of the shoulder. (c) detail of nucleus of 1½ whorls.

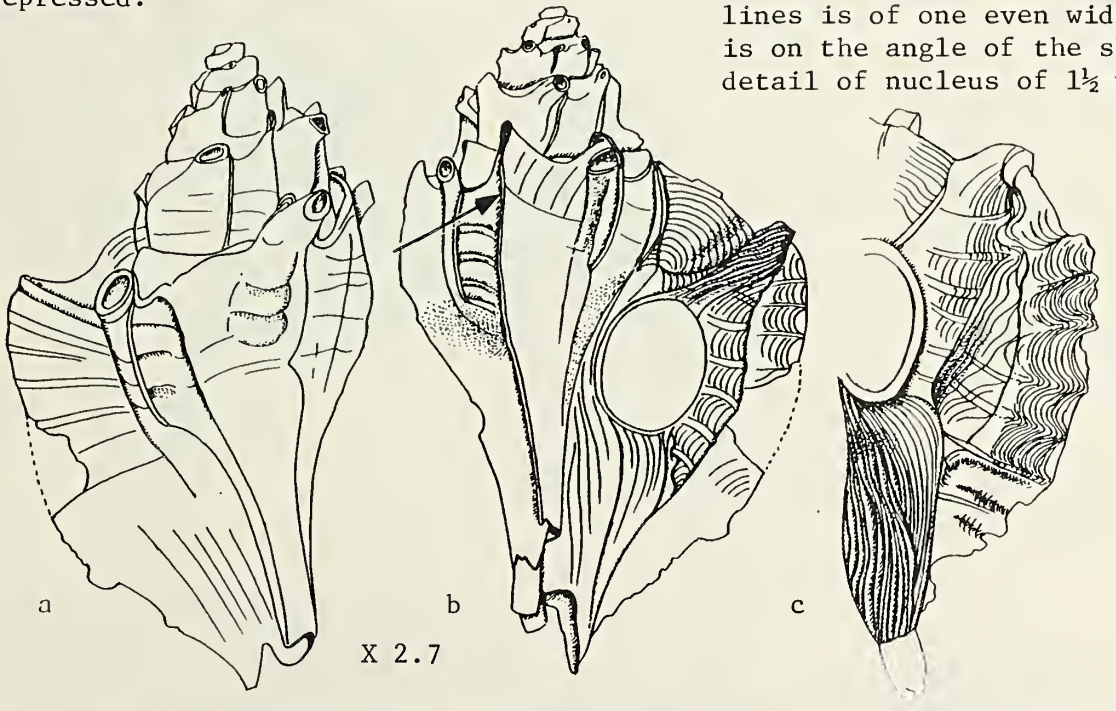


Figure 69. **Talityphis alatus* (Sowerby, 1850). (a&b) dorsal and apertural views (c) detail of apertural flange showing incremental growth lines in numerous directions. Note the intervarical fold, draped above (see arrow). The outer portion of the apertural flange is a single, thin layer. This is apparent in many *Talityphis* species.

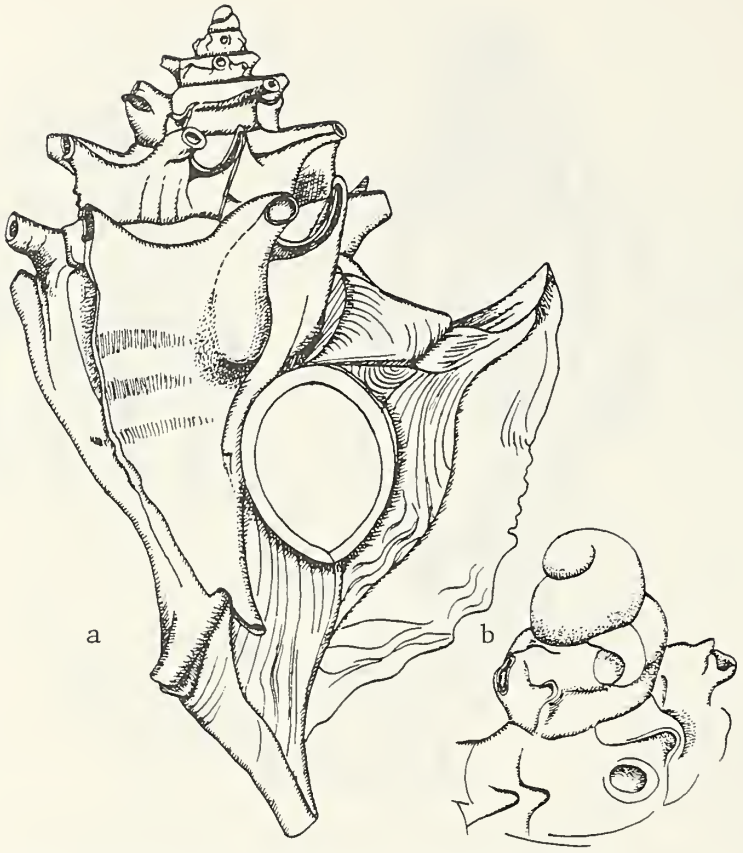
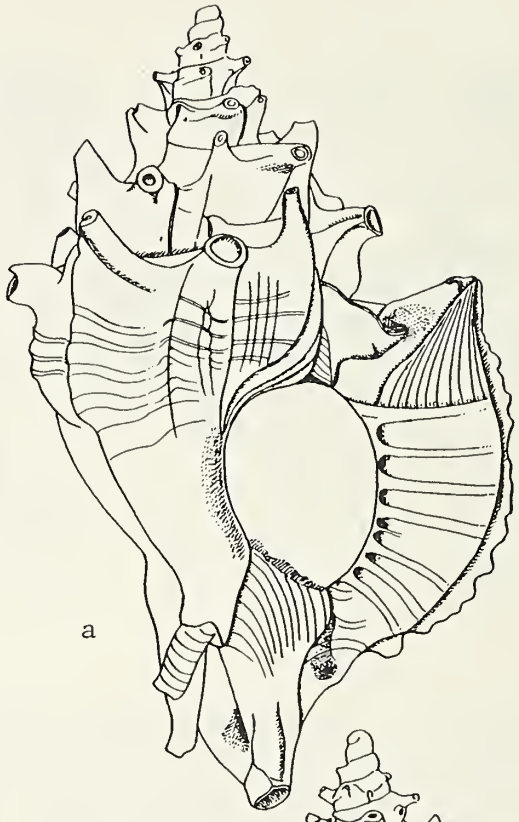


Figure 70. *Talityphis campbelli* Radwin and D'Attilio, 1976, holotype, SDNHM 63077. 18 mm L, 8.4 km S. of Corregidor, Philippines in 170 m (a) apertural view (b) protoconch of 1½ whorls



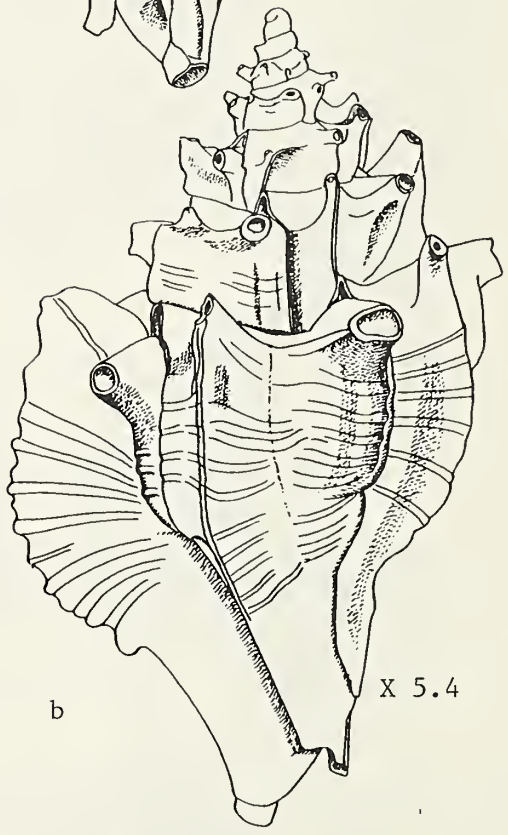


Figure 71. **Talityphis carmenae* (Gertman, 1969) (a&b) apertural and dorsal views.

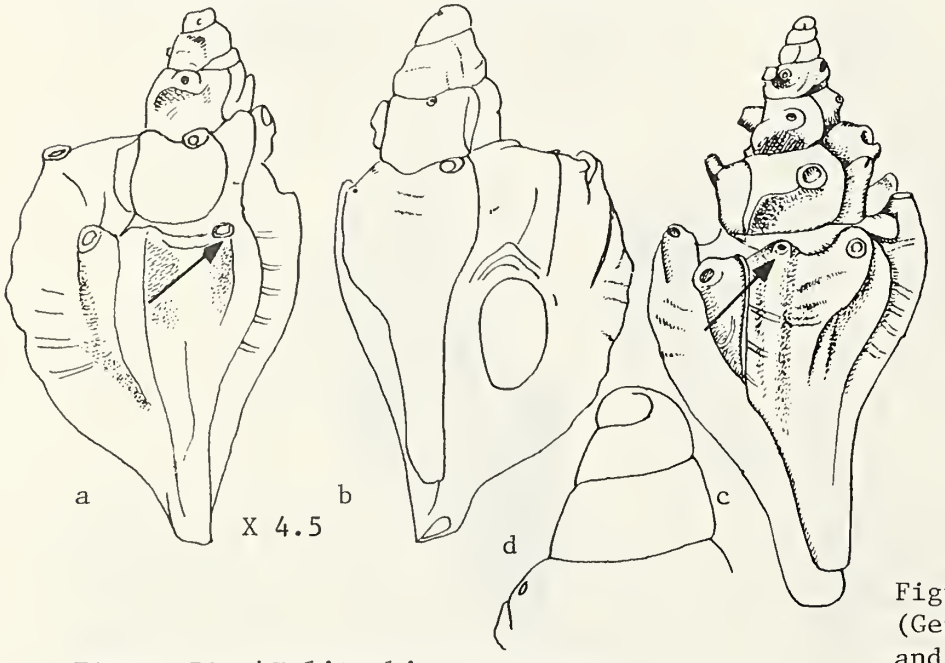


Figure 72. **Talityphis eucteanus* (Woodring, 1970). (a&b) dorsal and apertural views of Specimen 1 (c) dorsal view of Specimen 2 (d) tall protoconch of 2½ whorls of Specimen 2. Note at arrows, the intervarical area forming a tubelike swelling depressed terminally rather than a fold as in other *Talityphis*.

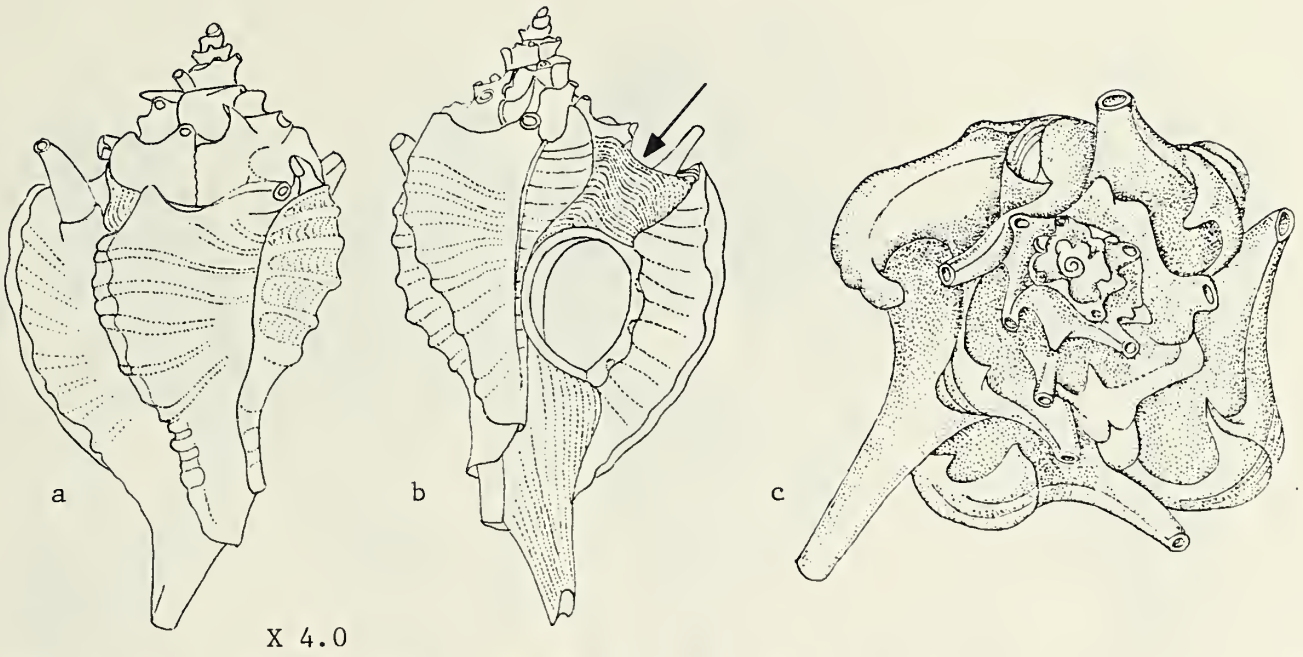


Figure 73. *Talityphis expansus* (Sowerby, 1874), type of *Talityphis*. (a&b) dorsal and apertural views (c) view from the spire. Note that the partition (at arrow) and the flange are strongly developed in this species. Both spine and partition are recurved. Also note the strong transverse sculpture.

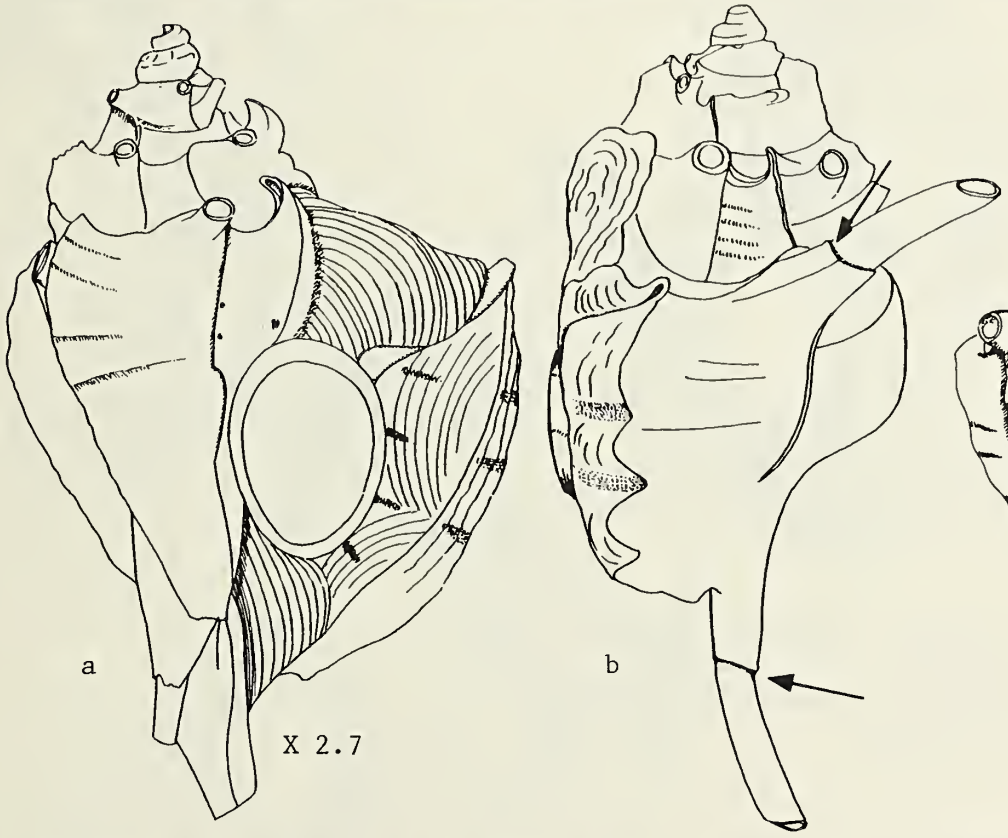


Figure 74. *Talityphis latipennis* (Dall, 1919). (a) from 25.6 m (14 fm) off Punta Coyote, Baja California, Mexico, apertural view (b) SDNHM 76511, 37.2 mm L, dredged, Guaymas Sonora, Mexico, ex Skoglund coll., lateral view showing repaired anal tube and siphonal canal (at arrows).

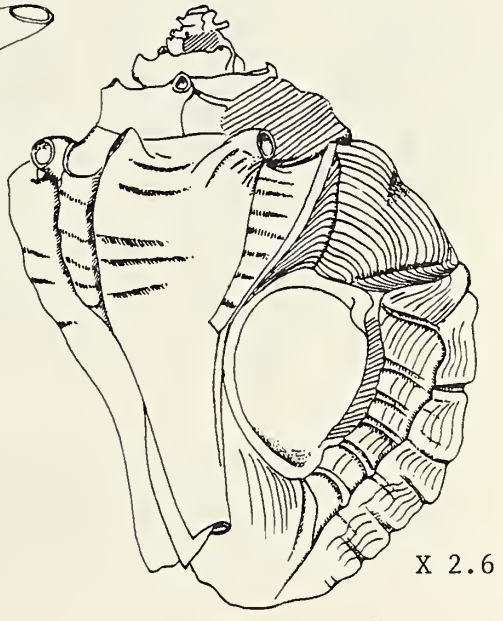


Figure 75. **Talityphis obesus* (Gabb, 1873). Apertural view, diagonal lines showing broken areas of the shell.

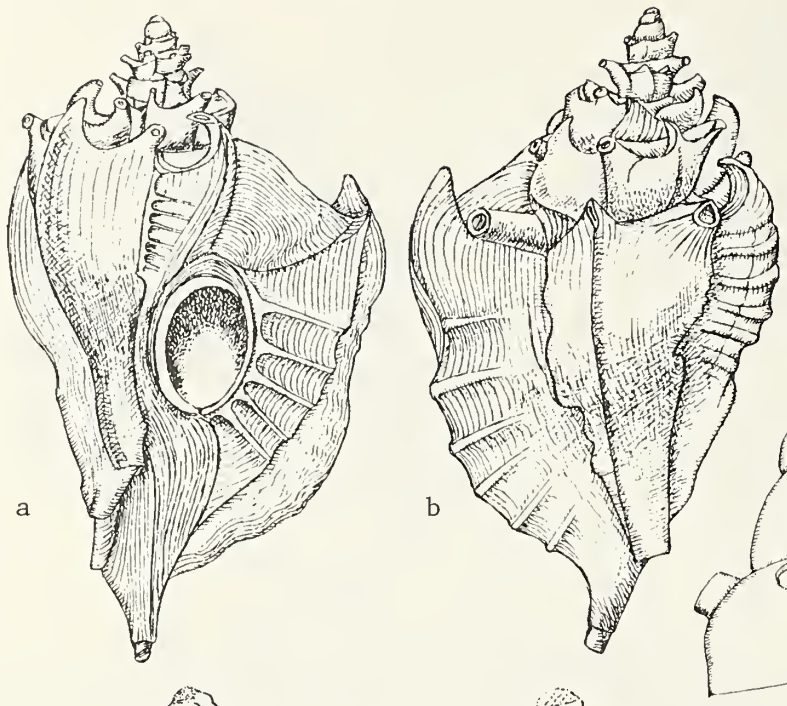


Figure 76. *Talityphis perchardei* Radwin and D'Attilio, 1976, holotype, SDNHM 63079. 28.5 mm L, off Bocas Trinidad, ex Perchard coll. (a&b) apertural and dorsal views (c) protoconch of 1½ whorls. The transverse sculpture is much less pronounced or absent on *T. perchardei* when compared with *T. expansus*.

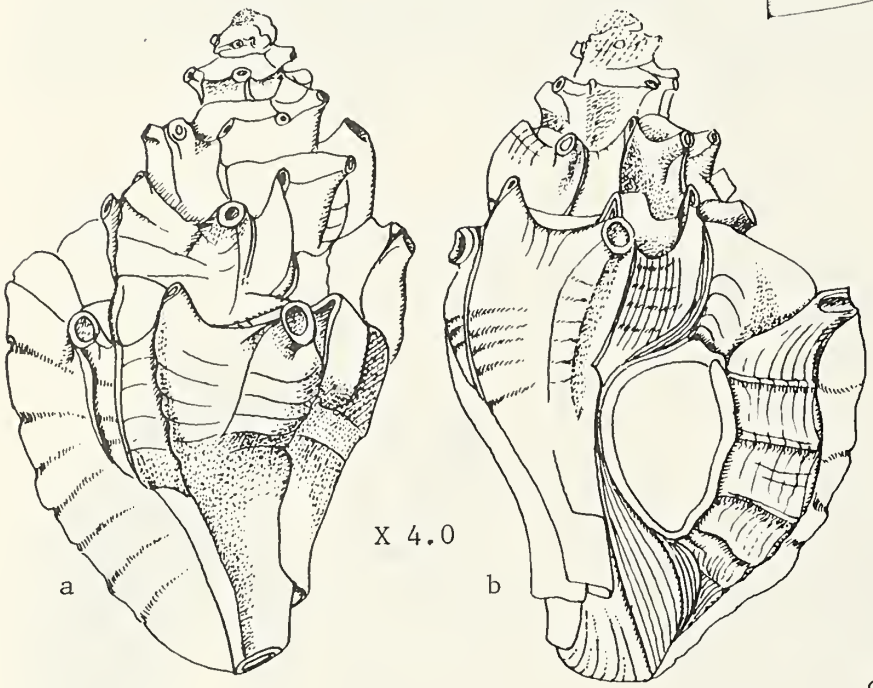


Figure 77. **Talityphis pterinus* (Gardner, 1936) (a&b) dorsal and apertural views. The intervarical fold, compressed above, is a common feature in many *Talityphis* species.

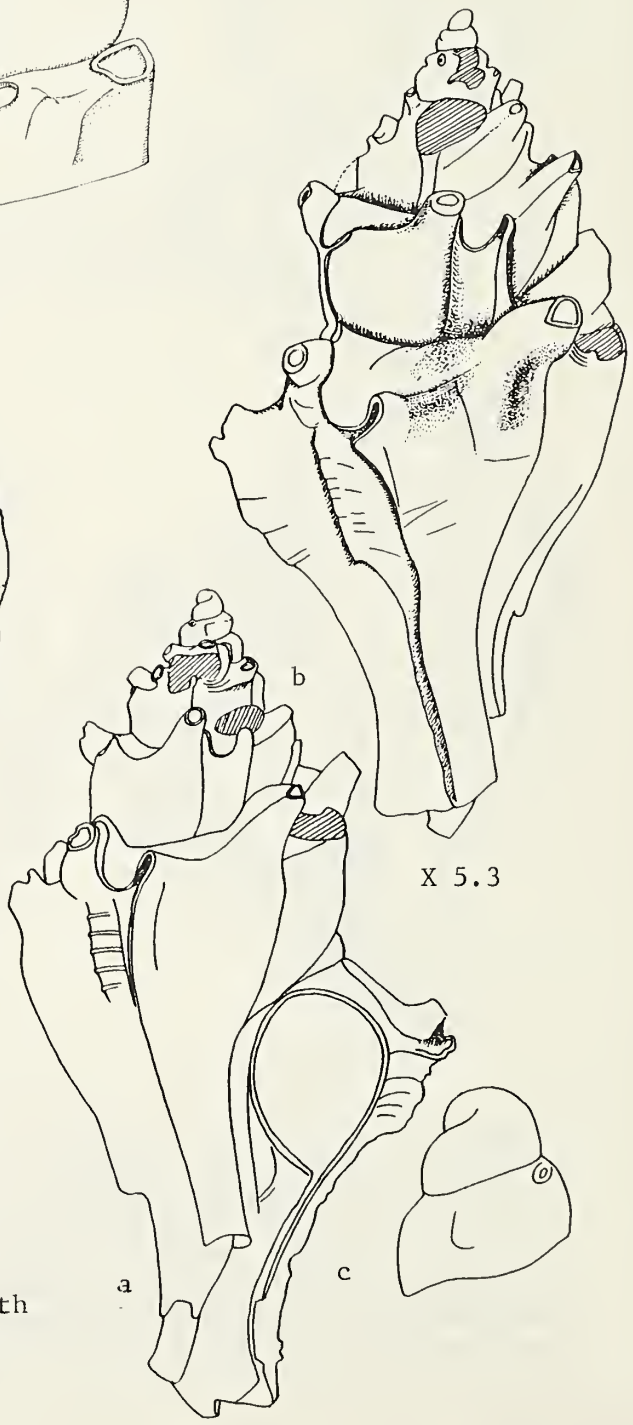
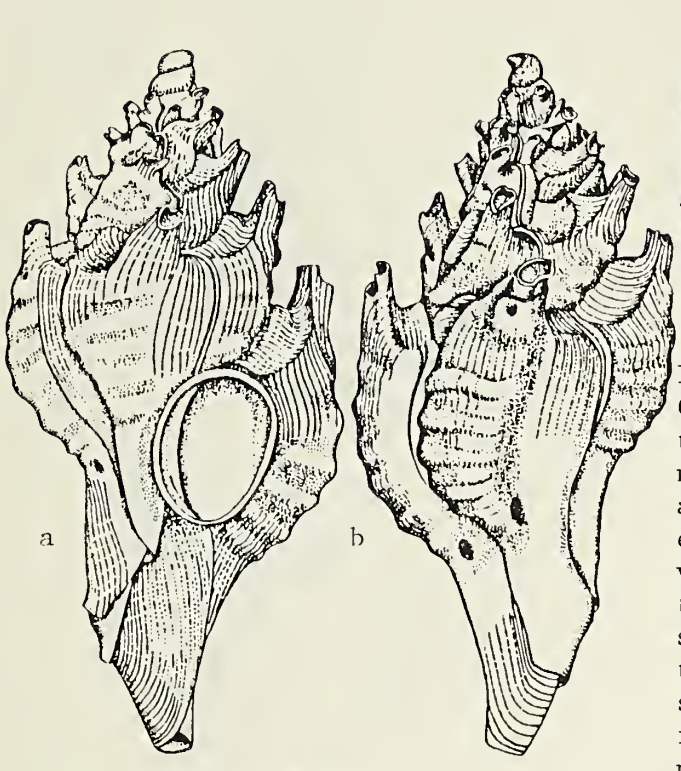
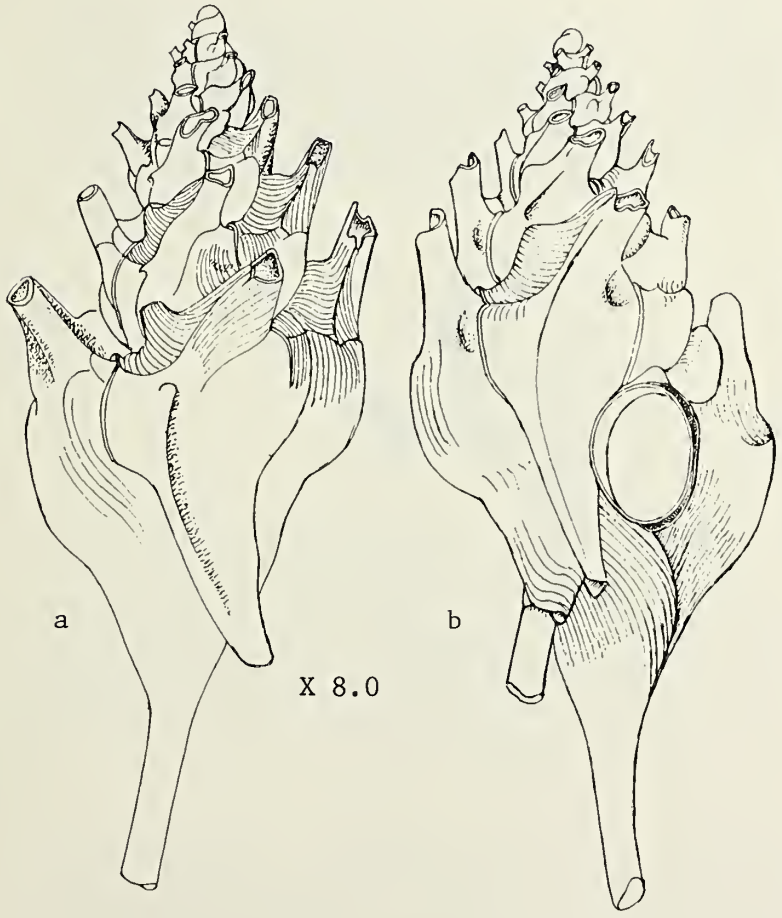


Figure 78. **Talityphis siphon* (Woodring, 1928). (a&b) apertural and dorsal views of a somewhat immature specimen (c) protoconch of 1½ whorls with indication of the first tube.



X 6.6

Figure 79. *Trubatsa erythrostigma* (Keen and Campbell, 1964). (a) apertural view. Note that the tube endings are very uneven and there are no swellings on the body whorl below the tubes as in *Siphonochelus*. Note also that the tube envelops the varix. (b) dorsal view. In this view, the essential character of the genus, the tubes coming out broadly from the shell can be seen. On their inner side, the broad base of the tube is contiguous with the suture of the spire. (c) detail of the spire. This view illustrates the broadness of the tubes eliminating any true shoulder. The tubes point back and parallel to the shell curvature. They are compressed, or pinched in, not round.



X 8.0

Figure 80. *Trubatsa longicornis* (Dall, 1888), type of *Trubatsa*. (a&b) apertural and dorsal views. In this species the suture is hidden by the tubes and earlier partitions can only be seen from above. Although *Trubatsa* has been synonymized with *Siphonochelus* by some authors, the broadness of the base of the tube which stretches across the entire intervarical area, thus eliminating the shoulder distinguishes this genus from *Siphonochelus*.

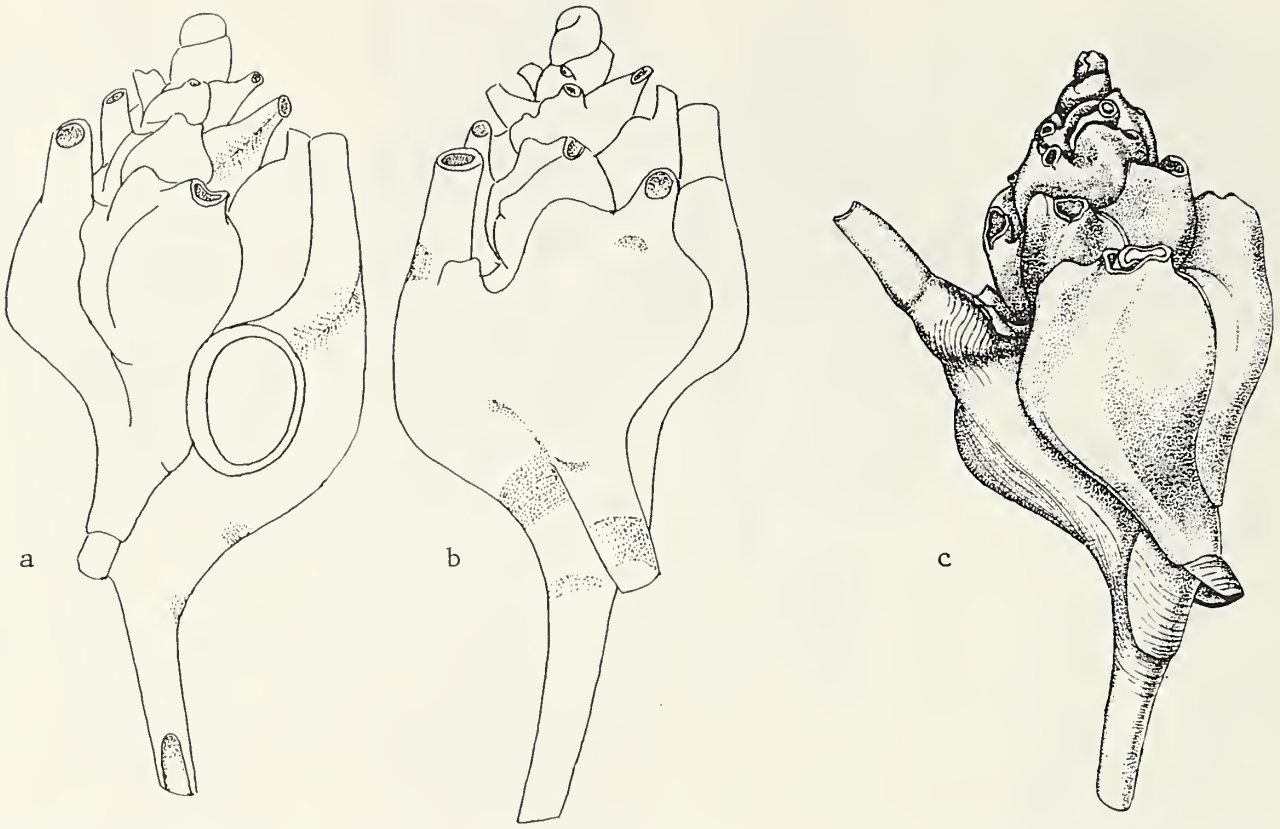


Figure 81. *Trubatsa pavlova* (Iredale, 1936), type of *Choreotyphis* Iredale, 1936= *Trubatsa* Dall, 1889. (a&b) SDNHM 86945, lot of 3 specimens, off Cape Moreton, Australia in 131.7 m (72 fm.), ex Pisor coll., apertural and dorsal views of a juvenile specimen, ± 11 mm L (c) dorsal view of a mature specimen. This species is distinguished by an additional bulge on the forward side of the tube.

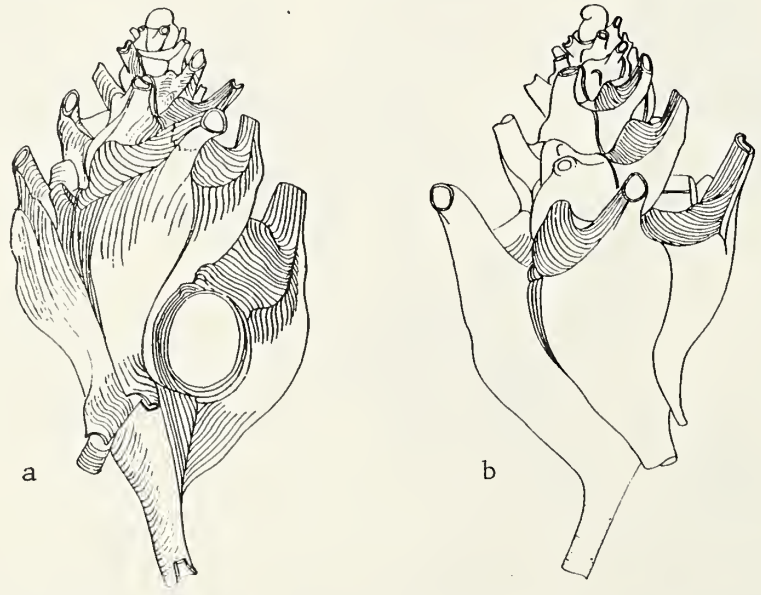


Figure 82. *Trubatsa tityrus* (Bayer, 1971), holotype, USNM 700005. 11.9 mm L, off Isla Margarita, Venezuela. (a&b) apertural and dorsal views. The base of the tube shows the typical broadness encompassing the entire intervarical area with a portion of the tube extending to the whorl above, this hiding the suture. Intervarical sculpture is lacking. Note also the partition.

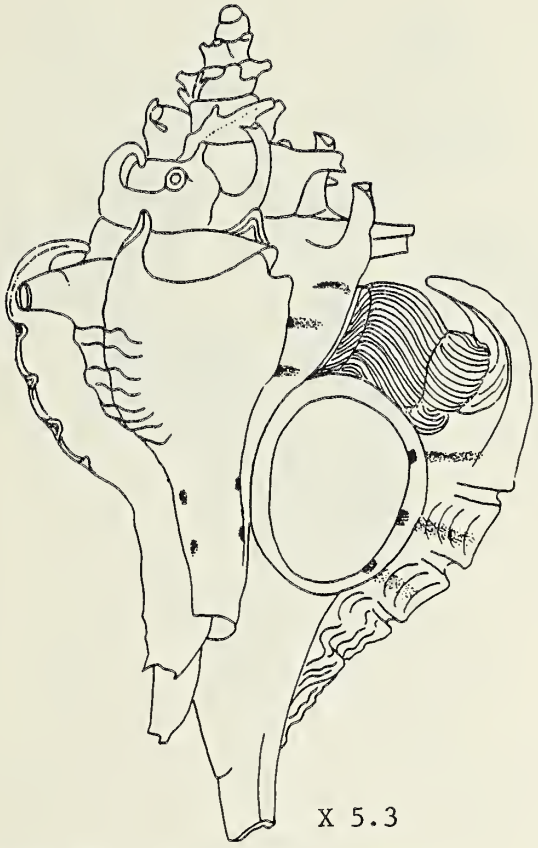


Figure 83. *Typhina belcheri* (Broderip, 1833), type of *Typhina*. Apertural view showing the single curved intervarical spine. The functional tube is obscured by the partition and the spine on the apertural flange.

Figure 84. *Typhina bivaricata* (Verco, 1909) 4.8 mm L, off Neptune Is., S. Australia (a&b) dorsal and apertural views. The arrows point to the raised sculptural element on the receding side of the old varix. This is not a double varix, but two elements of the same varix. Note that the leading edge of the old varix is part of the old outer lip.

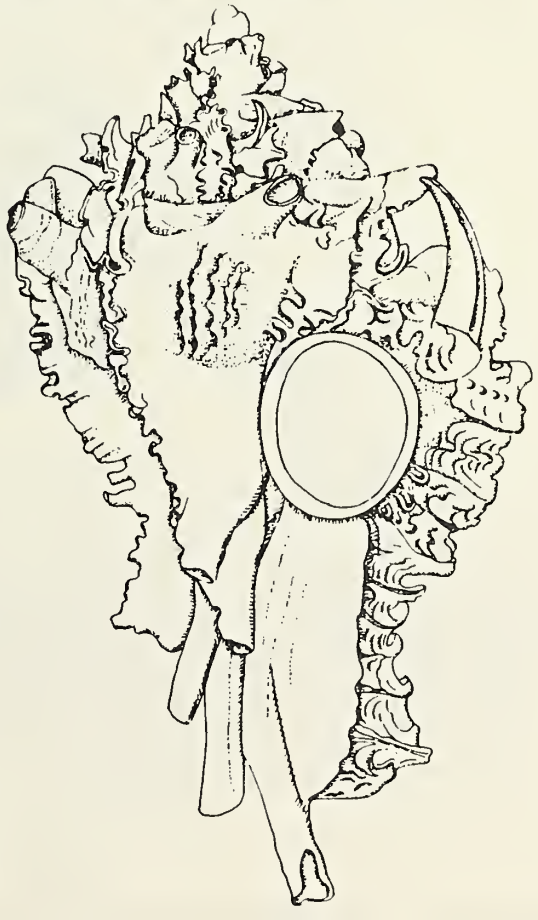
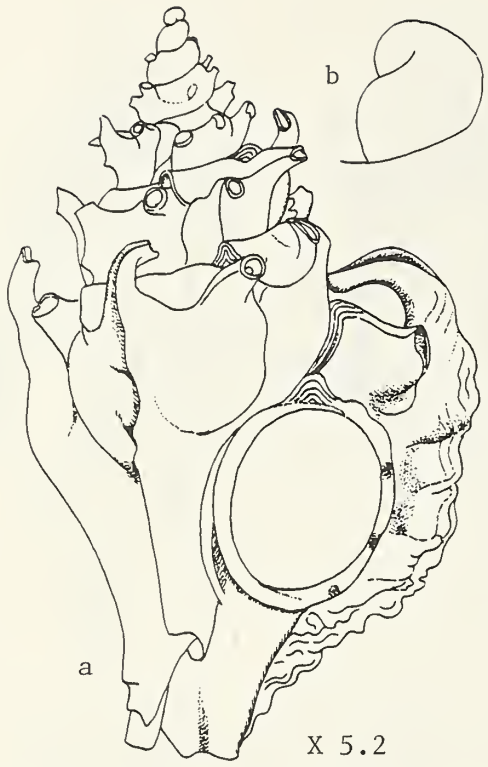


Figure 85. *Typhina carolinae* Houart, 1987. 18.5 mm L, off Grand Recife Sud in 65 m, Houart coll., Although not atypical in form, this species has, additionally, very elaborate surface sculpture of elevated lamellose fimbriae, fluted or scale-like, over most of the shell and a strongly erect aperture.



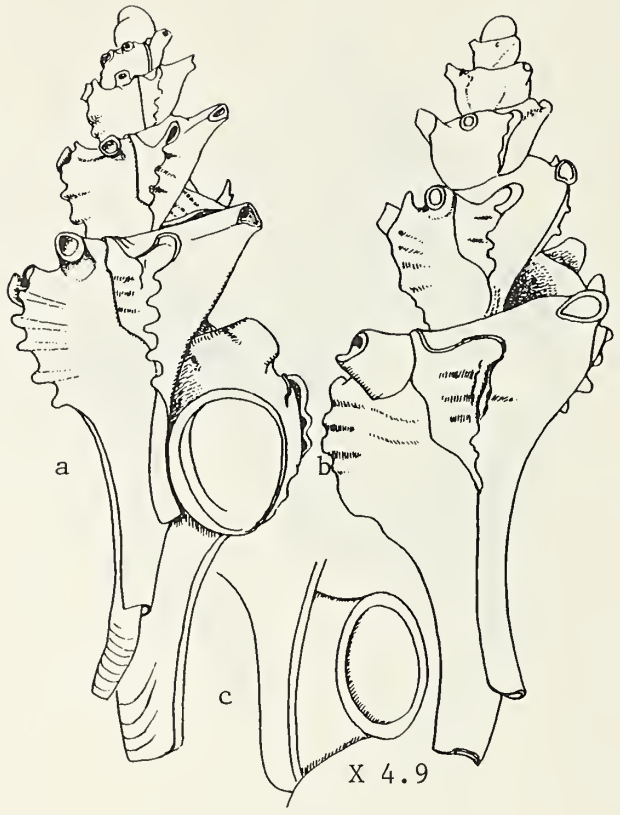


Figure 86. *Typhina cleryi* (Petit, 1840). Dredged off Rio de Janeiro, Brazil, ex Houart coll. (a) apertural view (b) protoconch of 1¼ whorls

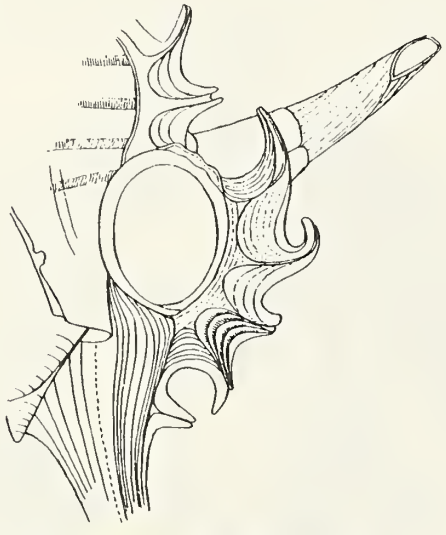


Figure 88. *Typhina imperialis* (Keen and Campbell, 1964. Detail of the complicated nature of the apertural flange, the mid-portion composed of overlapping lamellae and the area between the outer lip and the flange strongly depressed.

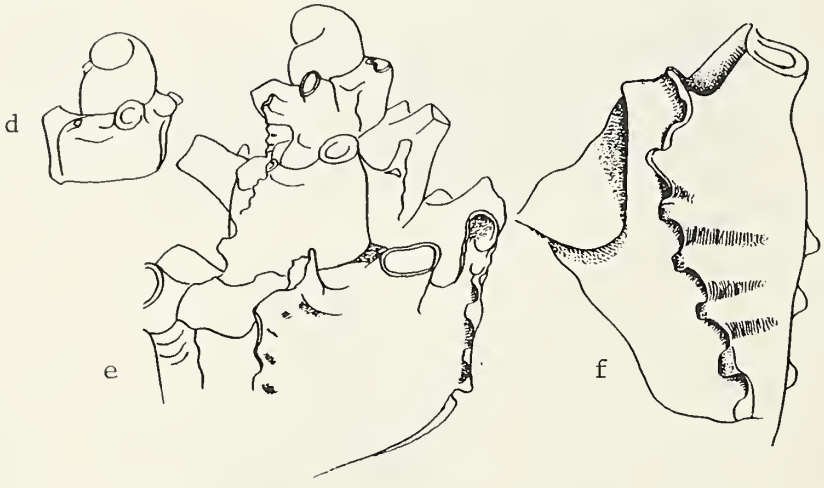
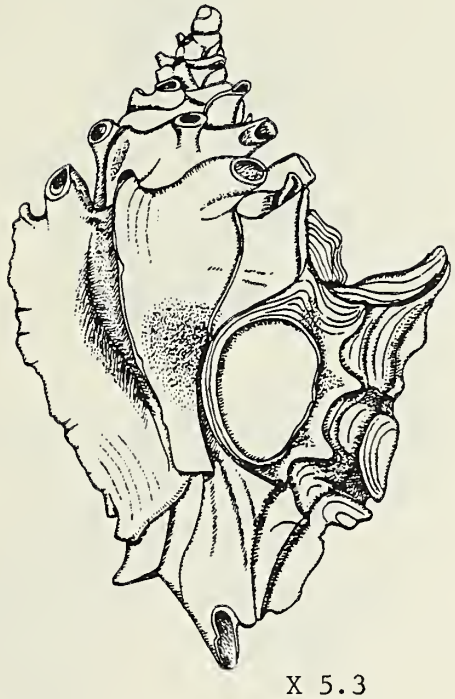
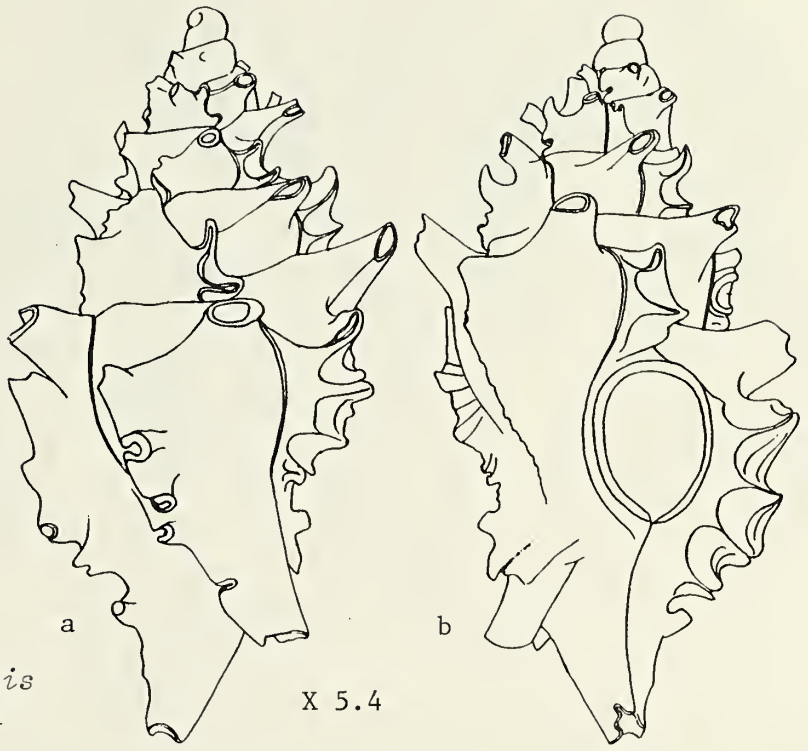


Figure 87. *Typhina disjuncta* (Tate, 1888). (a&b) apertural and dorsal views (c) detail of strongly erect and disjunct aperture (d) protoconch of ± 1 3/4 whorls. This detail shows the immediate appearance of tubes with the first growth episode. (e) detail of spire (f) detail of intervarical sculpture. As the species name implies, the aperture and peristome extend beyond the shell. This is one of the most slender of the typhid forms.



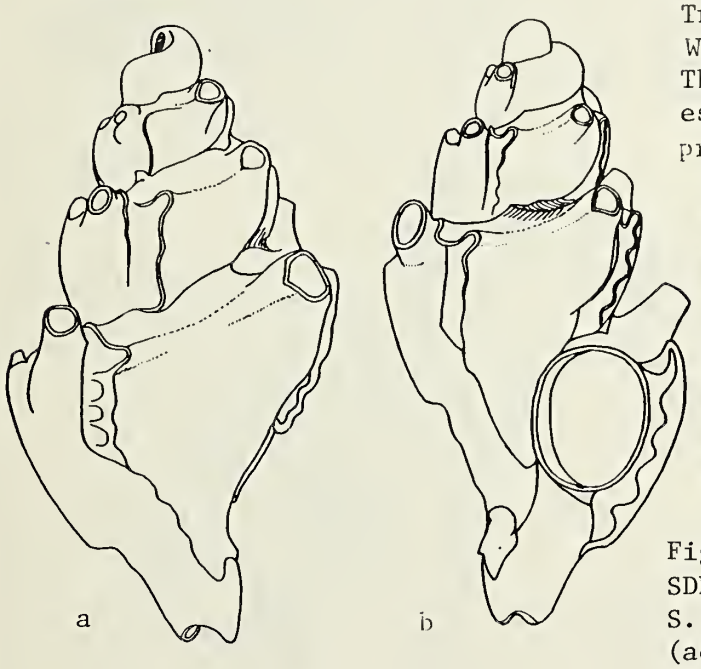
X 5.3

Figure 89. **Typhina mississippiensis* (Gertman, 1969). TU 226, apertural view. Note the open spine at the shoulder



X 5.4

Figure 90. *Typhina montfortii* (A. Adams, 1863). Trawled in 183 m (100 fm.) off S. Taiwan, E. Wright coll. (a&b) dorsal and apertural views. The folding over of the apertural flange is especially noticeable in this species. Note protoconch of 1 3/4 whorls.



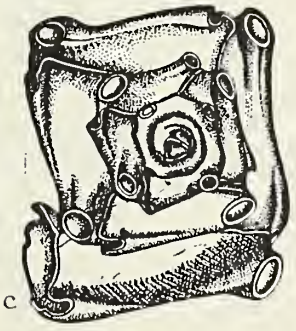


Figure 91. *Typhina nitens* (Hinds, 1843). SDNHM 63255, 16 mm L, washed ashore, Amami-Oshima, S. of Kyushu, Japan, ex Habe NSM, Tokyo, Japan (a&b) dorsal and apertural views (c) spire view. Of note in this species is the fold at the shoulder representing the varical sculpture as well as defining the shoulder. In the view looking down from the spire (c), the outline is strikingly rectangular.

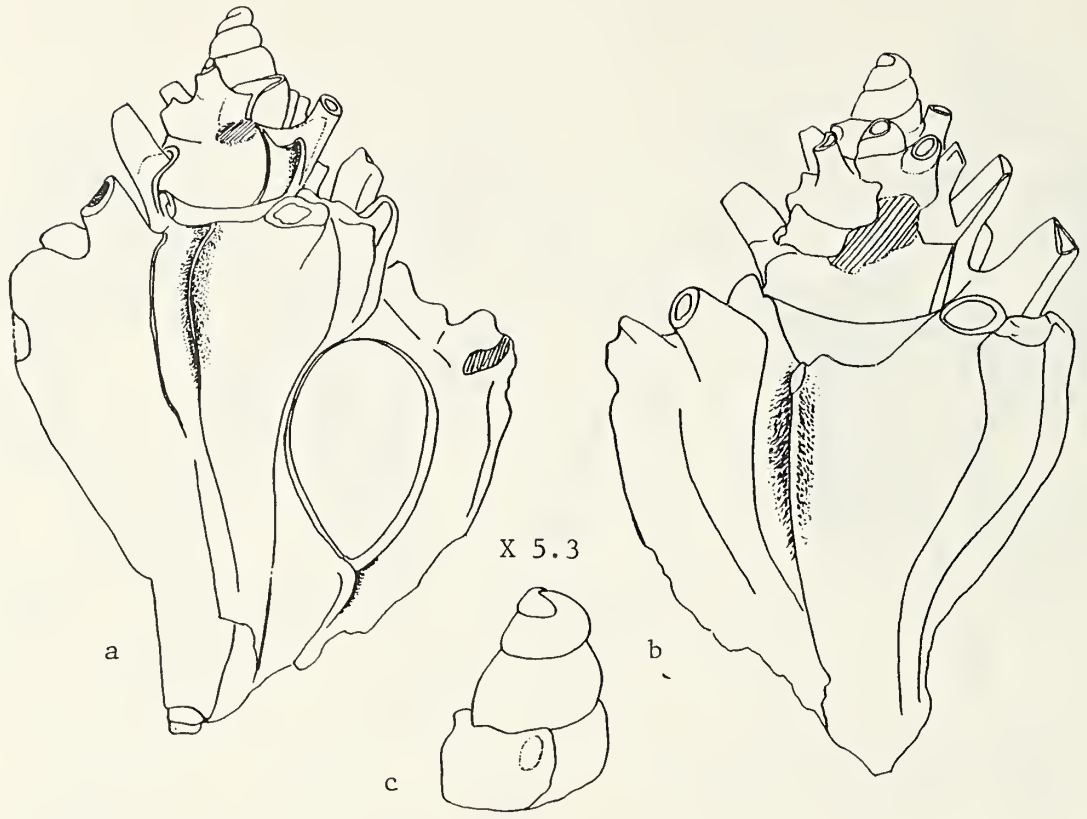


Figure 92. **Typhina palmerae* (Gertman, 1969). TU 924 (a&b) apertural and dorsal views (c) protoconch of ± 3½ whorls. There is no partition in this species and the varical sculpture is reduced to a fold running almost parallel to the varical margin. The many whorled protoconch is rare among the typhids.

Figure 93. *Typhina pauperis* (Mestayer, 1916). (a-d) 6.0 mm L, trawled 110 m off Poor Knights Island, New Zealand, Glass & Foster coll. (a-c) apertural, dorsal and lateral views (d) two views of the protoconch of 2¼ whorls (e)(after Vella, 1961, pl. 47, fig. 24) apertural view. The specimen shown in (a-d) is an immature specimen of only 3 whorls. A mature specimen is shown in (e).

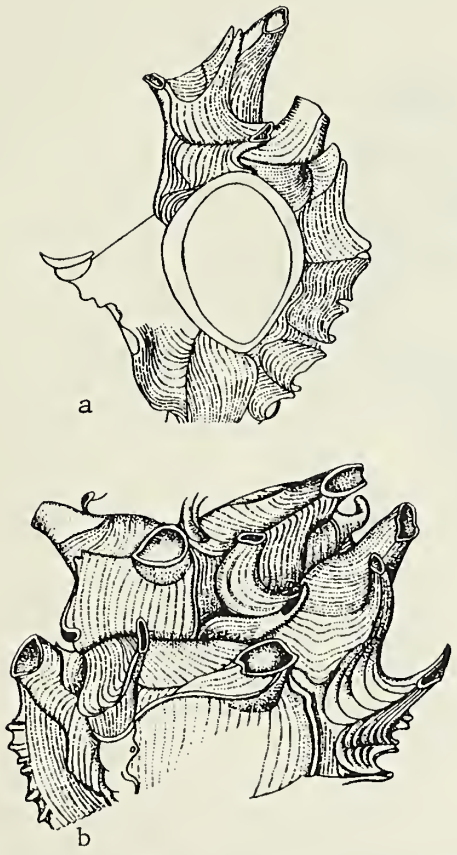


Figure 94. *Typhina philippensis* (Watson, 1883). (a) detail of aperture showing the incremental lines and strongly undulate varix (b) detail of dorsum of penultimate and body whorls showing sutural lines on tubes and spines.

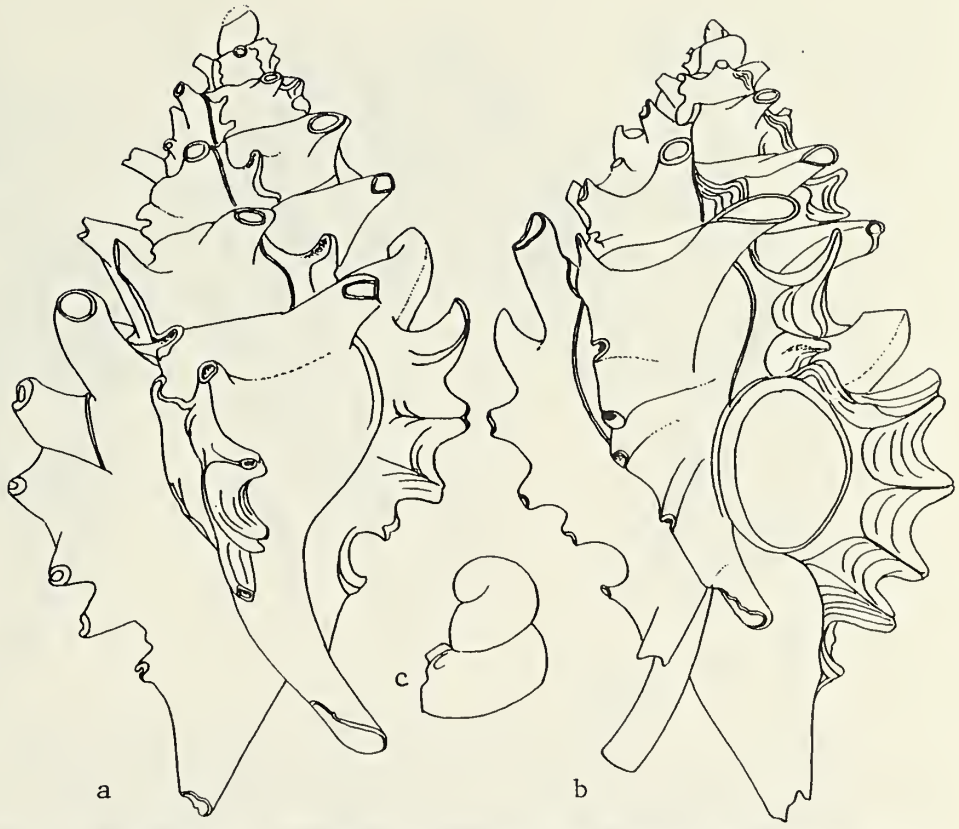


Figure 95. *Typhina ramosus* (Habe and Kosuge, 1970). SDNHM 83735, 14.5 mm L, Taiwan, ex Pisor coll. (a&b) dorsal and apertural views. Note that there is no partition in this species. This mature specimen has a thick white intritacalx. (c) protoconch of 2½ whorls from an immature specimen.

Figure 96. *Typhina riosi* Bertsch and D'Attilio, 1980. holotype, SDNHM 78309, 11.5 mm L, off Tramandai, Brazil (a&b) dorsal and apertural views. This is a very simplified *Typhina*. There is no partition and the varical sculpture is not elaborate. Note the repaired tube (a). The new section has no suture but annular growth lines. (c) protoconch of 1 3/4 whorls.

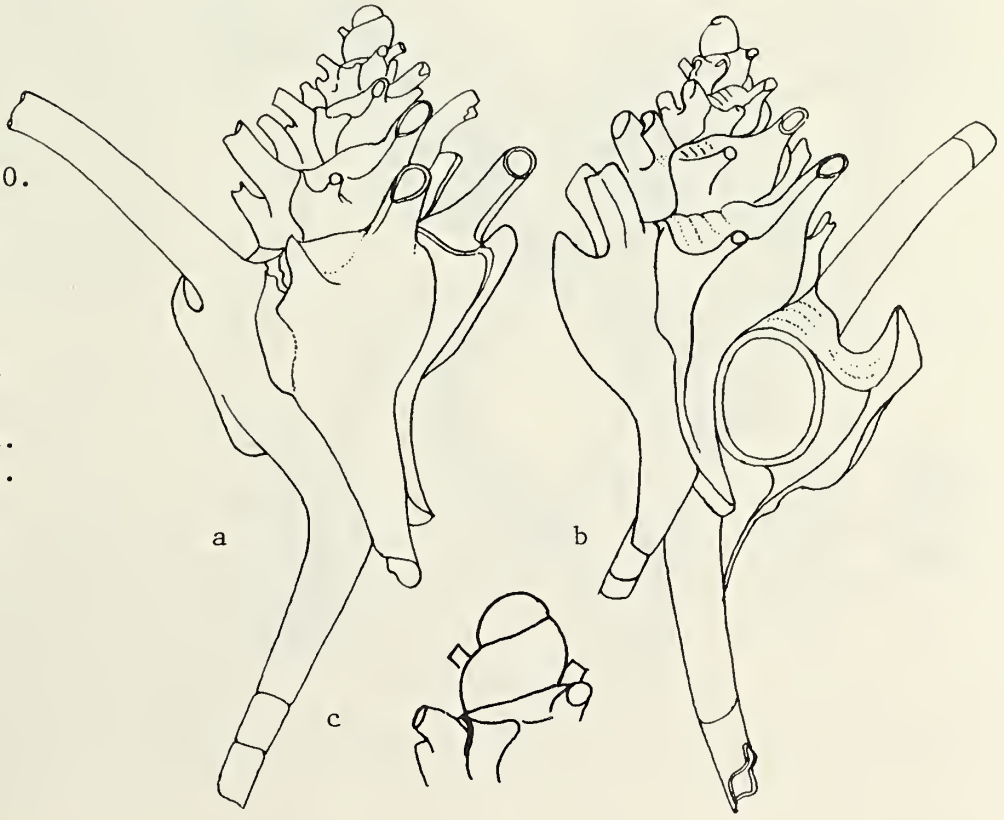


Figure 97. *Typhina yatesi* (Crosse and Fischer, 1865). (a&b) 27 mm L, from 13.7 m (45 ft), Coffin Bay, S. Australia, Glass and Foster coll. (b) lateral view highlights the length of the anal tube (10 mm) and siphonal canal (a) detail of aperture (c) SDNHM 85968, 15.1 mm L, Marrum Is., Australia, ex Horsfall coll., detail showing marginally scalloped varices approaching the broad rising shoulder. There is no partition. (d) protoconch of 2¼ whorls from 7.8 mm specimen, Glass and Foster coll.

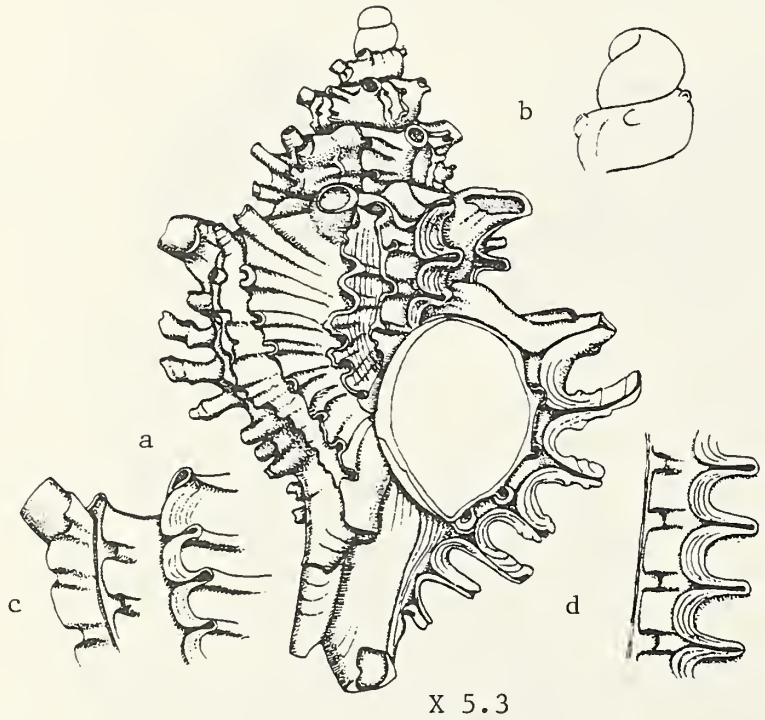


Figure 98. **Typhinellus acanthopterus* (Tate, 1888). (a) apertural view (b) detail of protoconch of 1½ whorls (c) details of varical sculpture showing an undulating raised flange (d) detail of apertural lip edge showing a rippled surface adherent to the margin and set back from this are spiny folds, some of which are weakly foliose. Note that this corresponds to the sculpture at (c) which is an earlier growth stage.

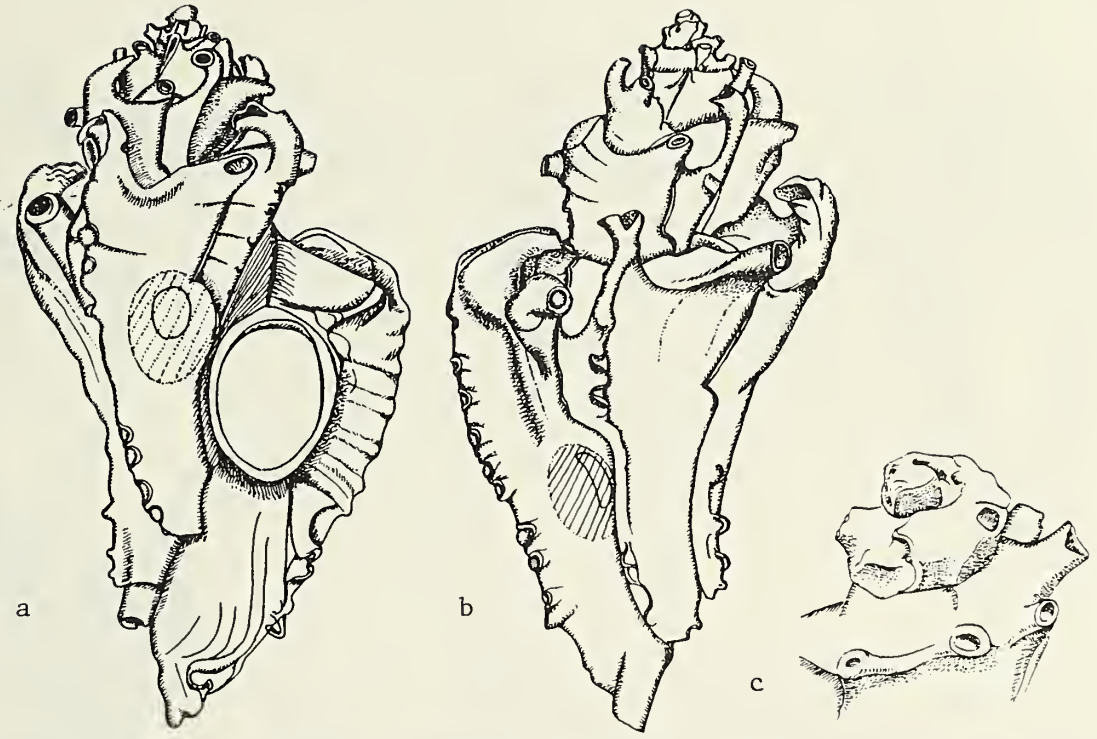


Figure 99. **Typhinellus carolinensis* (Olsson and Petit, 1964). paratype, SDNHM 81012, 31 mm L, Waccamaw Formation, Crescent Beach, S. Carolina, leg. and donor R. Petit. (a&b) apertural and dorsal views (c) detail of terminal portion of spire.

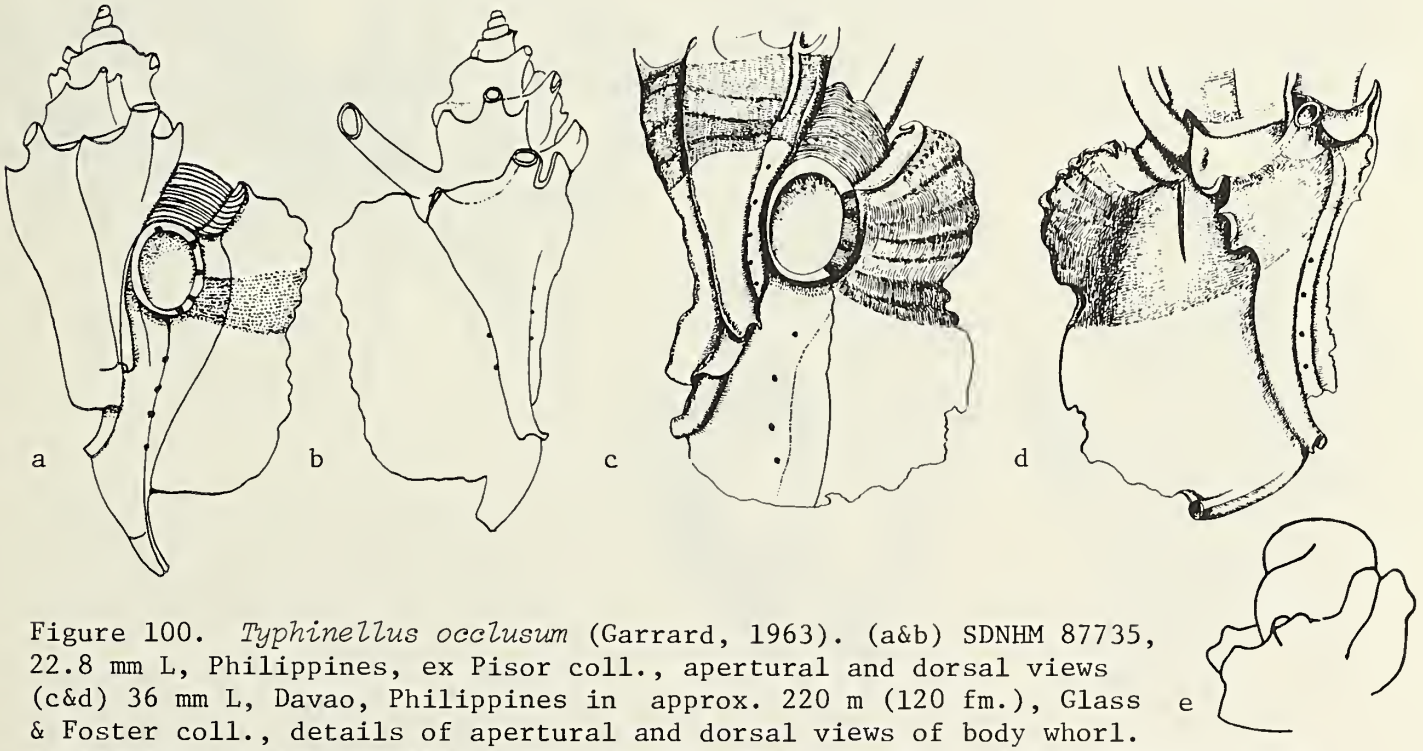


Figure 100. *Typhinellus occlusum* (Garrard, 1963). (a&b) SDNHM 87735, 22.8 mm L, Philippines, ex Pisor coll., apertural and dorsal views (c&d) 36 mm L, Davao, Philippines in approx. 220 m (120 fm.), Glass & Foster coll., details of apertural and dorsal views of body whorl. (e) detail of protoconch of ±1 3/4 whorls.
In addition to its variable brown banding, this species is distinguished by the partition and the broadly expanded simple flange. On the receding side, the partition and flange can be seen to be fused into one surface. The ridge of the varix is sharp, forming a varical fold posteriorly.

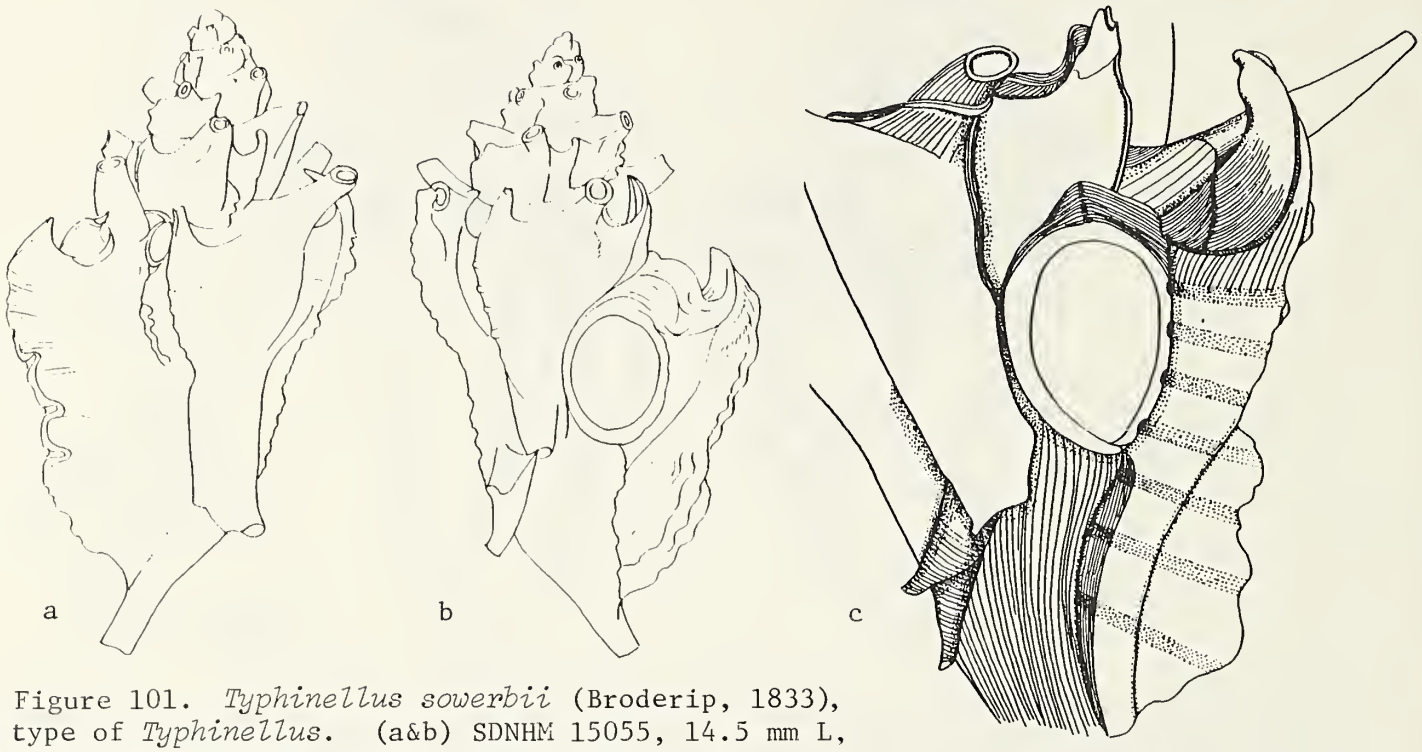
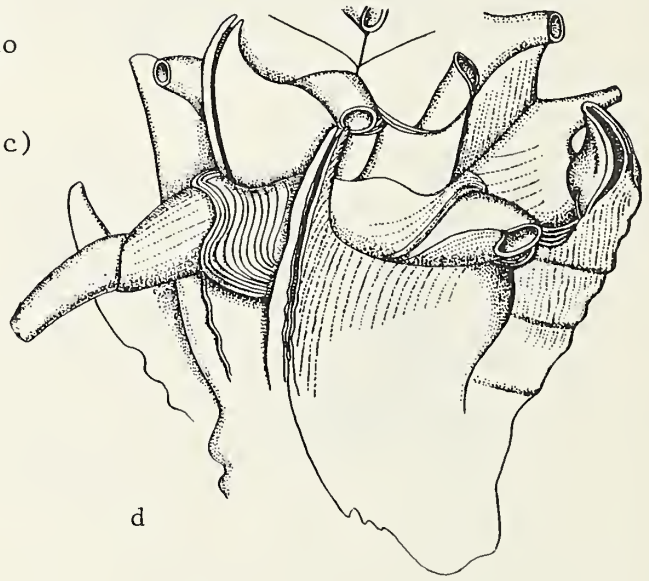


Figure 101. *Typhinellus sowerbii* (Broderip, 1833), type of *Typhinellus*. (a&b) SDNHM 15055, 14.5 mm L, Palermo, Sicily, donor: J.L. Baily, Jr. (as *T. tetrapterus* (Bronn, 1838)), dorsal and apertural views. (c&d) Cape Verde, W. Africa, ex D'Attilio coll. (c) detail of apertural area showing the different directions of incremental lines (d) dorsal view. This figure in conjunction with (c) highlights the dissimilar orientation of the tubes. Note also the repaired portion of the functioning tube.



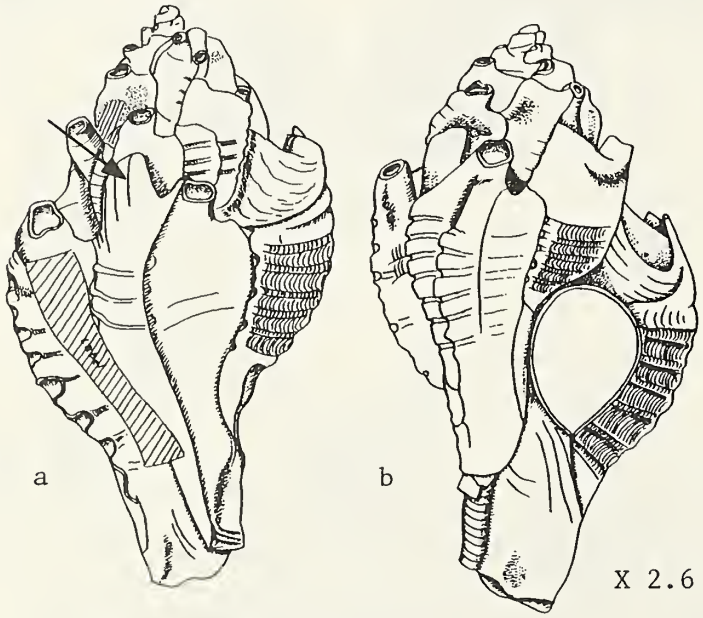


Figure 102. **Typhis gaasensis* Tournouer *in* Benoit, 1880. (a&b) dorsal and apertural views. Unlike the type of *Typhis* which has a visible shoulder, this species has a large pad-like callus extending across the shoulder and adherent to the whorl above (see arrow).

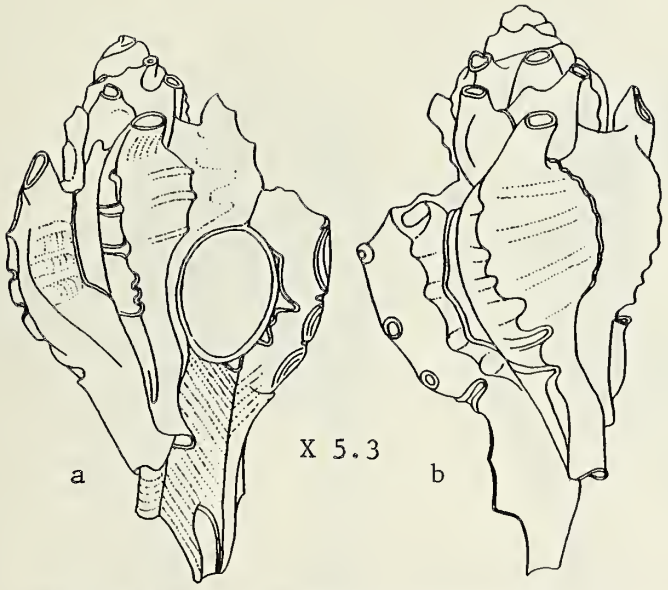


Figure 103. **Typhis parisiensis* Orbigny, 1850. (a&b) apertural and dorsal views. The species has three strong transverse cords giving the varical sculpture a rippled effect.

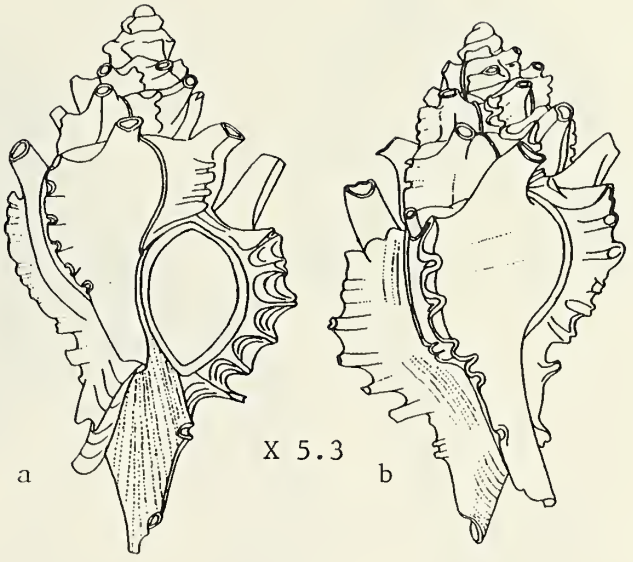


Figure 104. **Typhis rutoti* Cossmann, 1882. (a&b) apertural and dorsal views. Note the overlap of the left side of the canal over the right side and the intervarical ornamentation just behind the varical margin. The aperture is lenticular.

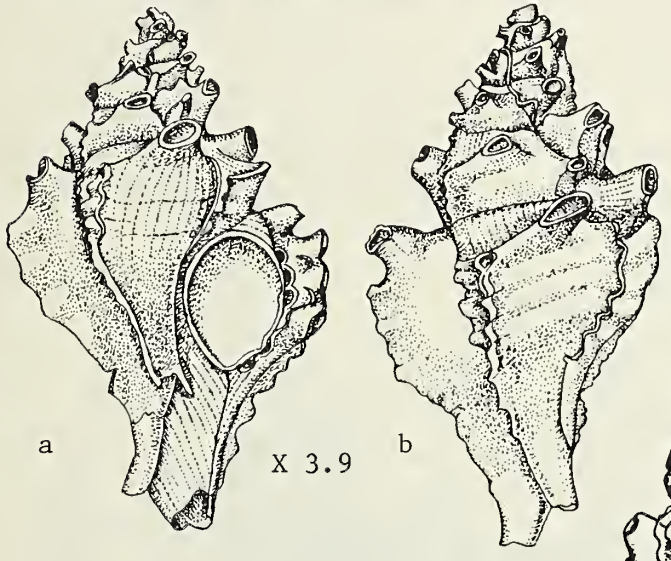
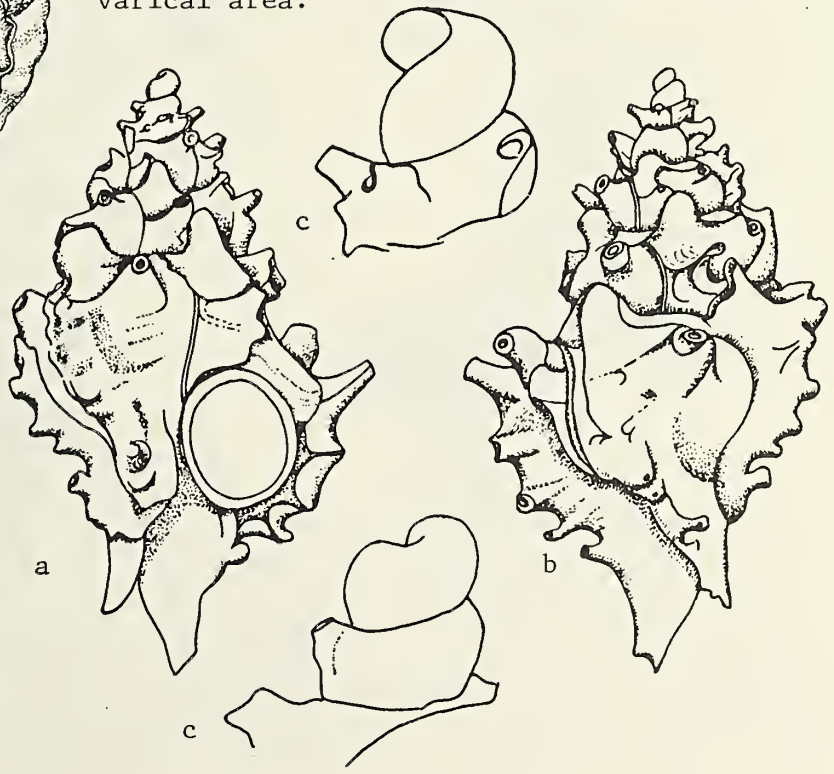


Figure 106. *Typhis wellsi* Houart, 1985. 22.1 mm L, West Australia, Houart coll., (a&b) apertural and dorsal views (c) protoconch of 2½ whorls. In this species a pad-like callus extends from above the varical ornament (between the margin and the tube) to the preceding whorl covering or eliminating the suture. This is often characteristic of *Trubatsa* while the varical spinosity of small closed spiny tubes recalls *Hirtomurex*.

Figure 105. **Typhis tubifer* (Bruguiere, 1792). (a&b) apertural and dorsal views. In this species the shoulder is well defined and the tube swells out to occupy the entire intervarical area.



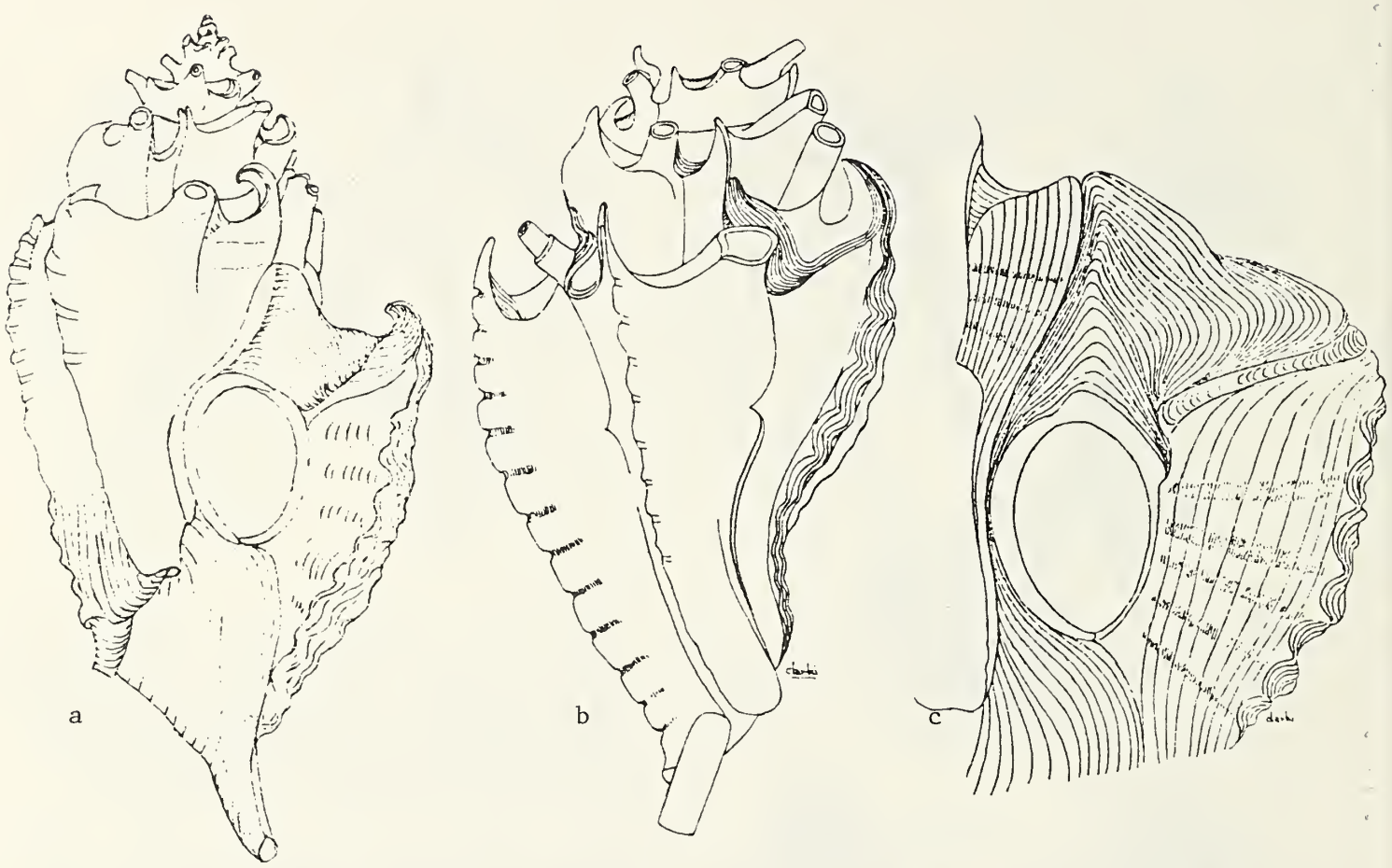


Figure 107. *Typhisala clarki* (Keen and Campbell, 1964). SDNHM 81088, 18.6 mm L, San Felipe, Baja California, Mexico, ex Gemmell coll. (a&b) apertural and dorsal views (c) detail of apertural area demonstrating the variable direction of incremental shell growth.

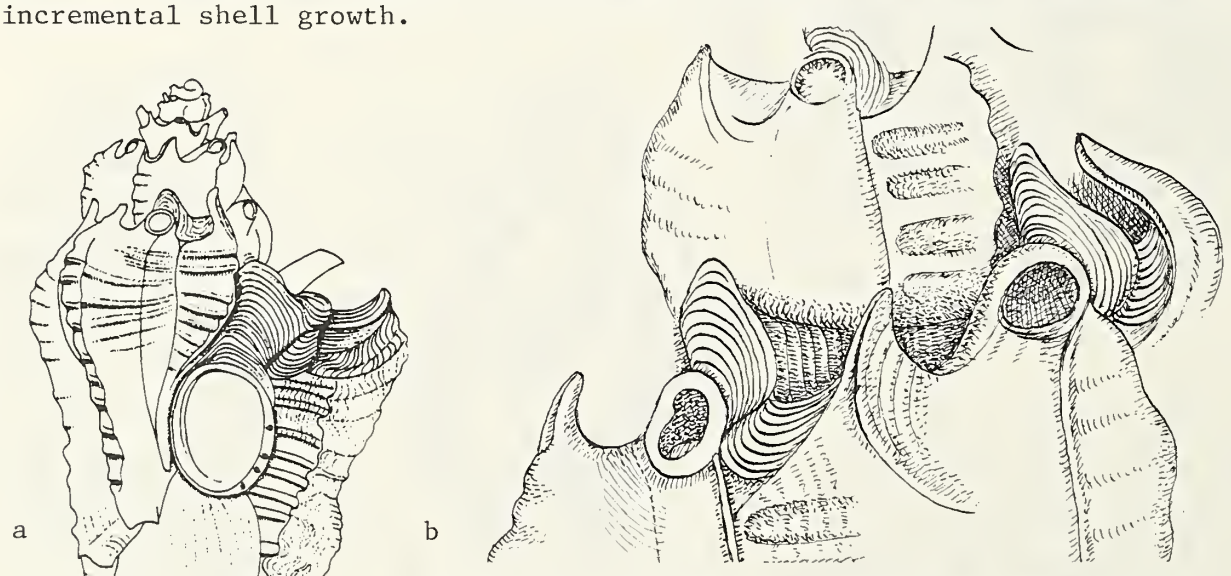
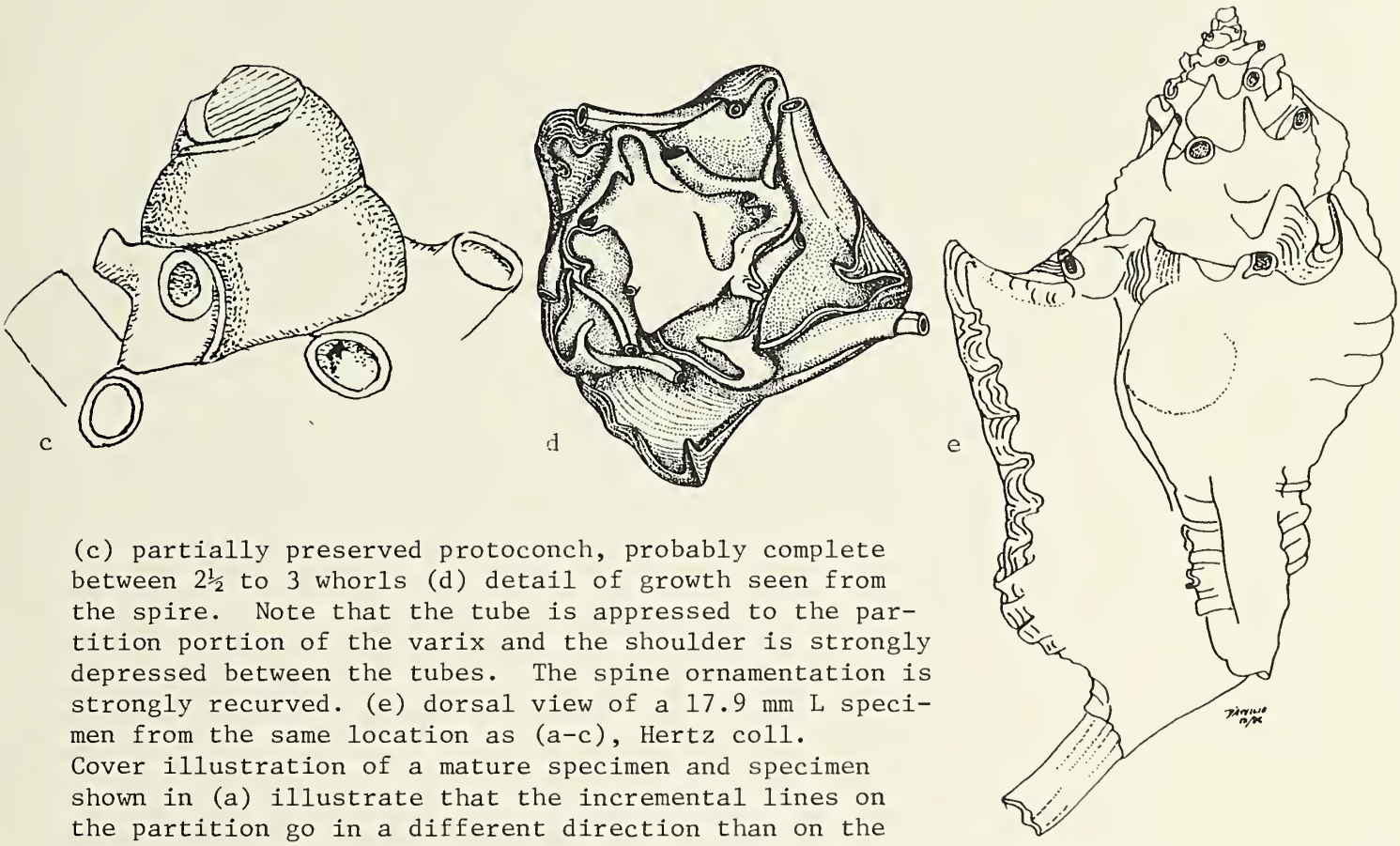


Figure 108. *Typhisala grandis* (A. Adams, 1855), type of *Typhisala*. (a-c) SDNHM 90773, 13.7 mm L, Playas del Coco, Guanacaste, Costa Rica, in mud in 24-36 m (80-120 ft.), ex Skoglund coll. (a) apertural view of a "dwarfish" mature specimen (b) detail of spiny tipped extensions arising from the costae on the body. See next page.



(c) partially preserved protoconch, probably complete between 2½ to 3 whorls (d) detail of growth seen from the spire. Note that the tube is appressed to the partition portion of the varix and the shoulder is strongly depressed between the tubes. The spine ornamentation is strongly recurved. (e) dorsal view of a 17.9 mm L specimen from the same location as (a-c), Hertz coll. Cover illustration of a mature specimen and specimen shown in (a) illustrate that the incremental lines on the partition go in a different direction than on the varix. Note the overlap from the left to right side of the canal.

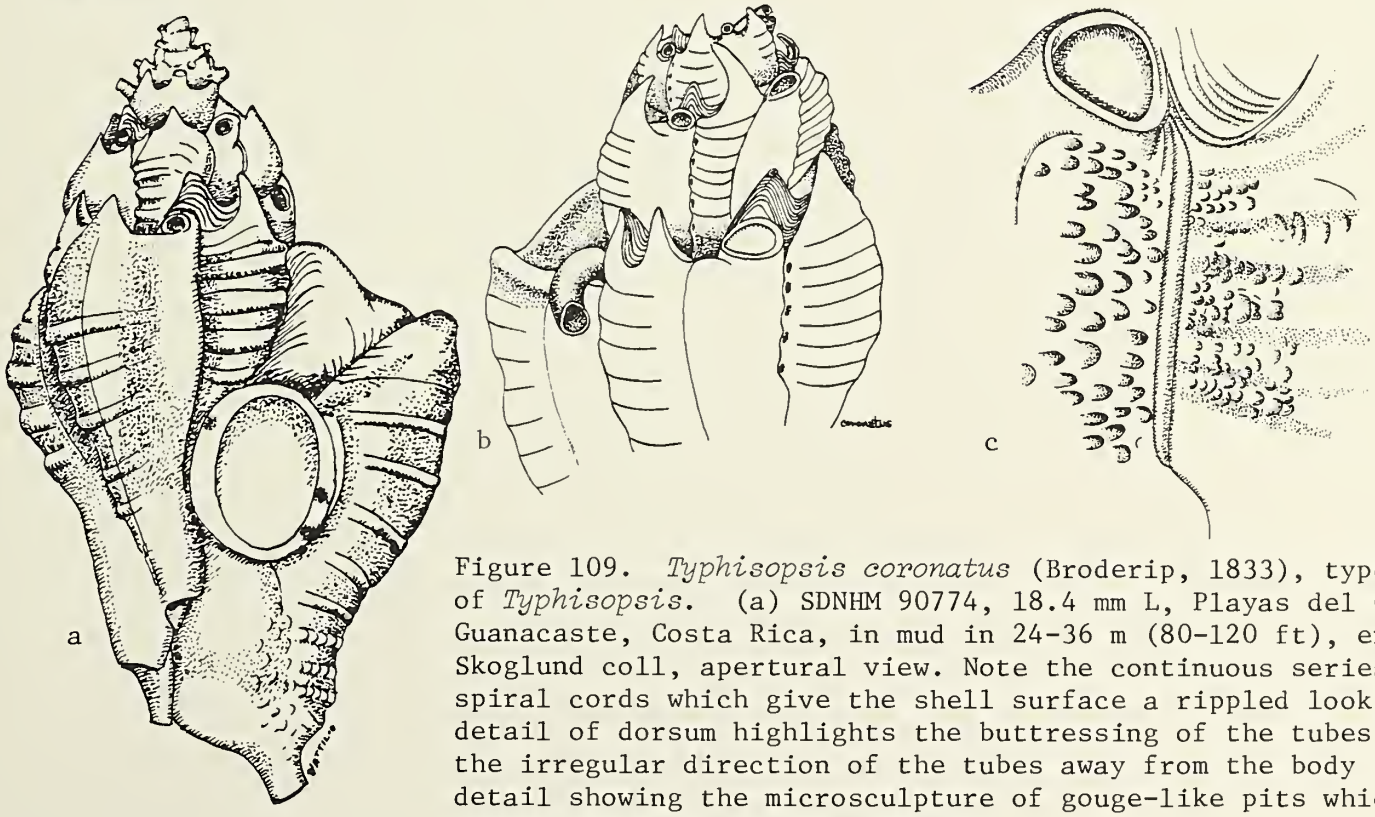


Figure 109. *Typhisopsis coronatus* (Broderip, 1833), type of *Typhisopsis*. (a) SDNHM 90774, 18.4 mm L, Playas del Coco, Guanacaste, Costa Rica, in mud in 24-36 m (80-120 ft), ex Skoglund coll, apertural view. Note the continuous series of spiral cords which give the shell surface a rippled look. (b) detail of dorsum highlights the buttressing of the tubes and the irregular direction of the tubes away from the body (c) detail showing the microsculpture of gouge-like pits which covers the entire shell surface.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